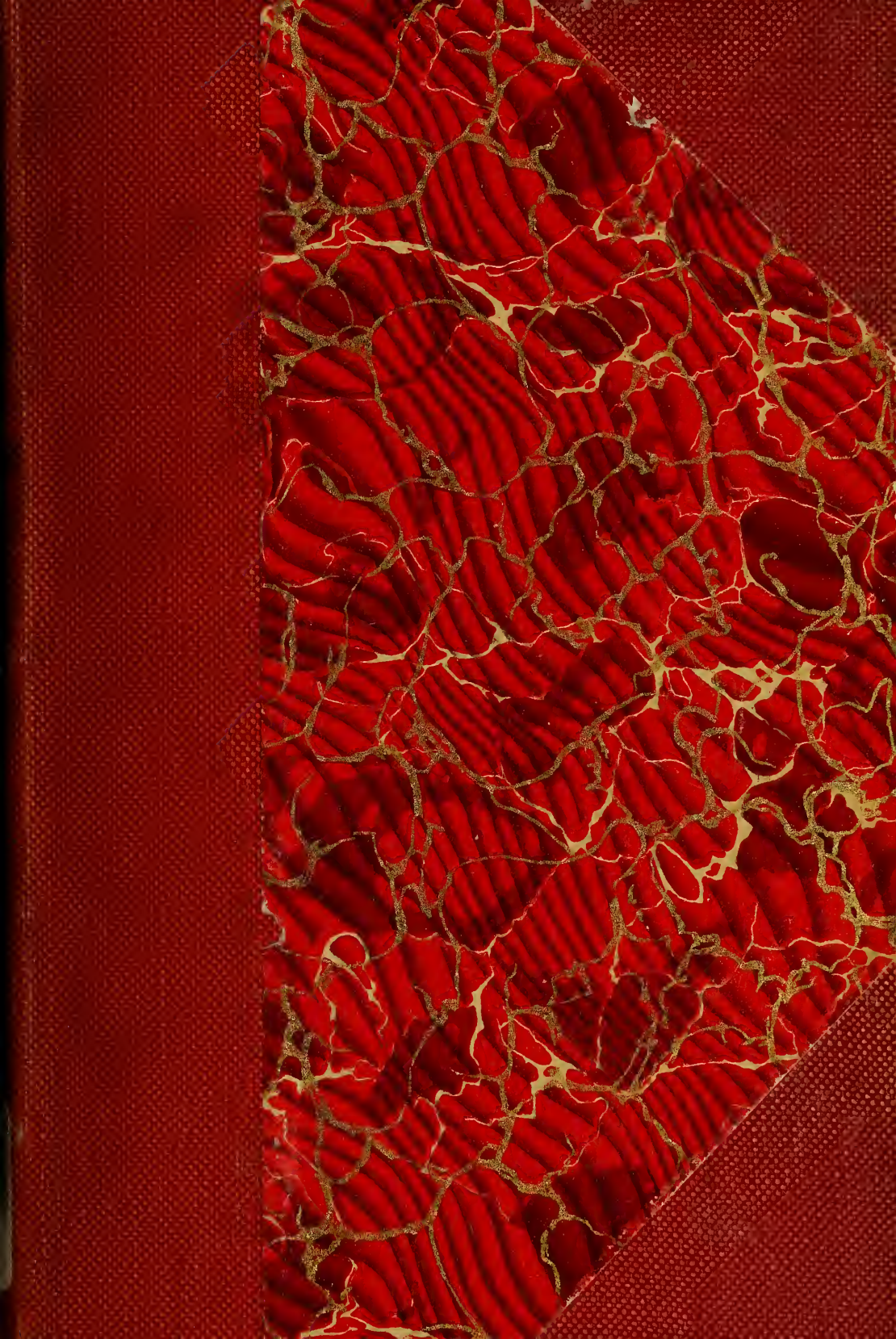

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THE JOURNAL & MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

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THE

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday evening, 10th April. Mr. C. Frost (one of the vice-presidents) occupied the chair, and there was an attendance of some sixty members and friends.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library:—"Journal of the Bombay Natural History Society," vii., 3, from the Society; "Proceedings Linnean Society of New South Wales," 2nd series, vii., 3, from the Society; "Journal of Royal Society of New South Wales," xxvi. (1892), from the Society; "Oological Notes," by A. J. North, F.L.S., from author; "Gall-making Buprestidæ," and "Notes on Family Brachyscelidæ," &c., by W. W. Froggatt, from author; and "Journal of Pharmacy," March, 1893, from Society.

MEETING FOR PRACTICAL WORK.

There was a good attendance at the meeting for practical work held on Monday evening, 27th March, when some microscopic members of the group Protozoa were briefly described by Rev. W. Fielder. Microscopes were then called into requisition, and practice obtained in killing, staining, and mounting some of these minute forms of life, the most successful results being obtained by killing a species of Epistylis, found in great abundance on the Crayfish (*Astacopsis bicarinatus*) inhabiting the University lake, with absolute alcohol, and then staining with hœmatoxylin.

REPORT OF EXCURSION TO CARRUM.

Mr. J. Shephard, who had acted as leader, reported results of a recent excursion to Carrum, when a small but enthusiastic contingent of members lighted upon some good "finds" in the brackish water in that locality, some young specimens of Actinozoa and a member of the dino-flagellate group being particularly interesting.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. Halliday and Messrs. T. W. Bothroyd, M.A., and J. Gray were elected members of the Club.

GENERAL BUSINESS.

Dr. Dendy called attention to the fact that Baron von Mueller hoped shortly to issue a completing volume to Bentham's "Flora

Australiensis." The last volume appeared in 1879, and ever since then Baron von Mueller has, with his usual zeal and perseverance, followed up his work on the Australian native vegetation, with the final object of completing up to date the work referred to above.

Mr. G. A. Keartland then referred to reports of good "bags" of quail which had fallen to the lot of sportsmen in the country districts, instancing these successes as good proof of the wisdom of the Club in approaching the Commissioner of Customs to ask him to adhere to the present rule as regards the close season for these birds.

PAPER READ.

Mr. Thomas Steel's paper on "Cannibals and Cannibalism" proved a slight departure in the nature of its subject matter from those usually read at the Club's meetings, but the close attention with which it was followed showed that the subject was not altogether unpalatable to those present, possibly on account of the careful way in which the facts were compiled. Having referred to the origin of the term, the author stated that no authoritative records existed as to the Fijian and New Zealand anthropophagy, which he was specially about to describe. Various theories were then set forth to account for the extensive prevalence of this custom, and Mr. Steel favoured that which gave the origin of the practice in some ceremony of a religious nature and its gradual development into a feast of revenge, and from that to a regular established taste. The ceremonies attaching to an important event did not seem complete without this feast. Thus the different stages of the building of a temple or a chief's house or a large canoe were celebrated by a grand feast, at which human bodies formed an important item. Details were then given of the ovens and various articles, such as elaborately carved forks, in common use at the feasts, together with the different methods of procedure amongst the Fijians and the Maoris. Men only were allowed to eat *bokola*; to women it was *tabu*, except when the woman chanced to be the sole survivor of a chief's line, and as such entitled to partake of the flesh of those slain in battle as *utu* for her race. An extremely interesting paper concluded with a reference to the disappearance of the custom on the advent of Christianity to these regions.

EXHIBITION OF SPECIMENS.

The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Mr. A. Coles.—Sooty Owl (*Strix tenebricosa*), from Bayswater. By Mr. J. E. Dixon.—Cetotolites (ear bones), fossil Crabs, &c., from Older Pliocene Tertiary, Cheltenham; also rare Longicorn Beetle (*Rhytiphora rugicollis*), Victoria. By Mr. C. French, sen.—Life-history of the Victorian Emperor Moth (*Antheræa australis*), with parasites on cocoons

and on larvæ. The caterpillar of this moth has hitherto been confined almost exclusively to young saplings of Eucalypti, but has recently been attacking the Pepper Trees (*Schinus molle*) in many parts of the colony. By Mr. G. A. Keartland—A pair of Apteryx (*Apteryx oweni*), the fast disappearing wingless bird of New Zealand. By Mr. J. A. Kershaw.—Larva and pupa of *Papilio erectheus* (Don) and pupa of *Danaus erippus* (Cram.), from New South Wales. By Mr. W. Kershaw.—Specimens of *Hepialus* (*Charagia*) *ramsayi*, Scott (male and female), and *Hepialus* (*Charagia*) *splendens*, Scott (male and female), from New South Wales. By Baron von Mueller.—Orchid (*Cryptostylis leptochila*) from near Mt. Baw Baw and Dandenong Ranges, second time found in Victoria; collected by C. French, jun. Also, proof plates of thistles for the publication just being brought out for the Agricultural Department, to contain descriptions, &c., by Baron von Mueller; plates drawn by Mr. Ashley.

EXCURSION TO CARRUM.

On Saturday, the 18th of March, four members only arrived at Carrum to take part in the excursion fixed for that place with "pond life" for the object. One of those present was a lepidopterist, and devoted his time to his own pursuit. It appeared at first as if the day would yield but scanty results, the freshwater pools first visited being almost dried up. Attention was then directed to the saltwater creek, and gatherings taken for home examination. Sweeping the net through a mass of grassy-looking vegetation landed some young specimens of Actinozoa, which so readily detached themselves from the weeds, that they were at first taken for Hydrozoa; a large number were found floating in the water before some specimens were taken off the weeds. Examination of the material at home showed the presence of Protozoa of the genera Amphileptus, Thuricola, Zoothamnium, and Peridinium. The latter were very plentiful, and interesting as affording a demonstration of the presence of two flagella, one projecting and the other lying in an encircling groove. This arrangement of the flagella is characteristic of Lancaster's class Dinoflagellata, excepting one genus, and was originally misunderstood, it being represented as a projecting flagellum with a girdle of cilia. As most of the text books figure the wrong arrangement, it is worthy of note by members who interest themselves in the Protozoa. Specimens treated with iodine showed both flagella very well, the encircling flagellum being best seen when the animal's movements were rendered feeble by a slight application of the solution. In this state the corkscrew-like undulations could be noticed passing along the encircling flagellum. When quite active the undulatory movement was so rapid as to be either in-

visible or to give the appearance of ciliary action, which has caused the misinterpretation of these forms.

Mr. Anderson reports as follows on the Lepidoptera:—"To the lepidopterist Carrum, at the first glance, appeared but a poor collecting ground. The sheep had removed every vestige of grass and the sun had thoroughly baked the ground. That these circumstances were not fatal to all insect life was proved by the large numbers of grasshoppers disturbed at every footstep, while the Great Yellow-winged Locusts (*Œdipoda musica*, Fab.) would every now and then start up in alarm, and, having reached a distance, relax their hurried flight, and with their peculiar click! clack! click! drop into fancied security and silence. Around the ponds that afforded occupation to the major portion of the members present, the vegetation was still verdant, and here the little blues were flying in fair numbers, but though carefully scanned in hope of the rare coast species nothing but *Lycæna labradus* was observed. The first moth captured proved to be *Xanthorhoe percrassata*, a species by no means common everywhere, and subsequently three more specimens were obtained, together with the following species, mostly single specimens:—*Lucia lucanus*, *Phrissogonus lacticostalis*, *Asthena pulchraria*, *Hydriomena subochraria*, *Euchœca rubropunctaria*, *Dichromodes stilbiata*, *Stericta thyridalis*, *Acidalia rubraria*, *A. recessata*."—J. SHEPHARD.

CANNIBALS AND CANNIBALISM.

By THOS. STEEL, F.C.S.

(Read before Field Naturalists' Club of Victoria, April 10, 1893.*)*

To most people there is a certain fascination of feeling about such a subject as forms the title of my paper. However repugnant it may be to our minds, we cannot help feeling interested in a custom which we know to be so widespread amongst savage people, and which is so greatly at variance with the amenities which civilization has developed in our own social state. Indeed, it is perhaps to this strong contrast between our own manners and customs and those of the more primitive races of mankind that anthropological studies owe their chief attractiveness.

Having lived for some years in places where formerly the practice of cannibalism was the rule, and having while on the spot taken much interest in inquiring into the customs and observances by which it was accompanied, I have thought that a short descriptive paper on the subject would be within the scope of our Club, and would perhaps be of sufficient interest to warrant my bringing it forward.

It is not my intention to attempt to speak of cannibalism at

large, as, so widespread has it been amongst all sorts of savage races and in all parts of the world, that a very lengthy paper would be required even to deal with the subject very superficially. It is more my purpose to describe somewhat in detail what was the nature of the proceedings at cannibal feasts as practised in Fiji by the natives, and in New Zealand by the Maoris, the countries in which I had the opportunity of prosecuting my inquiries. About the origin of the term cannibal there exists some doubt. The "Encyclopædia Britannica" refers it to *Canibales* or *Caribales*, Latinized forms of the name of the Caribs of the West Indian Islands, as recorded by Columbus. In "The Story of New Zealand" Dr. Thomson gives the Latin expression—"*Propter rabiem caninam anthropophagorum gentis*," and the French—"*Appétit de chien*," as suggested sources of derivation.

Shakespeare makes Othello refer to the custom thus :—

> "The cannibals that each other eat,
> The anthropophagi, and men whose heads
> Do grow beneath their shoulders."
>
> —*Othello* i. 3.

In both Fiji and New Zealand anthropophagy, or cannibalism, was of considerable antiquity, and no proper records exist as to its origin. It has been considered by some that the custom was resorted to by the islanders of the South Seas because there were no large animals, and that in the absence of animal food the instinct for flesh as a part of the diet overcame the natural repugnance of human beings to eating their own kind.

The inhabitants of these islands and of New Zealand, however, had ample supplies of animal food in the flesh of birds, whales, porpoises, seals, turtle, fish and many molluscs, and always largely availed themselves of these resources.

From the remotest historical periods we have evidence of the existence of the custom in all parts of the world, and, curiously enough, it is not amongst the lowest races of mankind that it appears to have been most prevalent, but rather amongst those which have reached a very fairly advanced stage in the development of civilization. The Fijians, Maoris, and Papuans are all peoples of a high order of intellectual development, and may be instanced as examples—as, indeed, may any races which have acquired a special notoriety as cannibals. Some old proverbs say, "Hawks don't tear out hawks' eyes," and "Bears do not eat bears' flesh;" and we find that man, in his crudest and most primitive state, is but little, or not at all, addicted to devouring his own species. Again, it has been suggested that the custom has originated in, or developed from, some form or other of religious ceremony involving human sacrifice; and, again, that it was purely from motives of revenge that man first learned to partake of the flesh of his fellow men.

A very probable theory, and one which is strongly supported by much internal evidence, is that of the origin of the practice in some ceremony of a religious nature, and its gradual development into a feast of revenge, and from that to a regular established taste. In whatever manner first originated, it is certain that the taste for human flesh acquired a very firm hold on the people, and may, indeed, be said to have developed into a craving. When the Fijians were excited by the wild frenzy of the *mêkê ni bokola*, or cannibal dance, the desire for human flesh became practically irresistible.

In the mode of preparation of the bodies and the ceremonies which surrounded the cannibal feast there was great similarity amongst the Fijians and the Maoris. Important events, such as the different stages of the building of a temple, or a chief's house, or a large canoe, were celebrated by a grand feast, at which human bodies formed an important item. On the whole, the Fijians appear to have been even more inveterate cannibals than the Maoris, which is a little surprising when we contrast the dispositions of the two races. The Fijian is a bright, laughter-loving individual, like his own sunny skies, fond of fun and joking. On the other hand, the Maori is grim and dignified; and, although athletic and fond of games of skill, is of a grave and taciturn disposition.

Let us consider first, in a general way, the cannibal customs of the Fijians. Suppose some event, such as the construction of a large canoe, requires the celebration of the indispensable feast. The warriors, painted and adorned with all their wild finery, assemble in the *rara*, or village green; a special *mêkê-mêkê* or dance is indulged in, which has the effect of working them into a state of violent excitement. The party then start off, either in canoes or by land, to secure victims. It was of little consequence where they went, for in those evil old days each tribe was at war with its neighbours, and so all were foes. Usually stratagem was resorted to, and the hapless victims were surprised when working in their cultivated ground or engaged in other ordinary pursuits, and either summarily clubbed or securely bound and carried away in triumph.

In the case of tribal wars the victorious party would return bringing the prisoners and as many of the bodies of the slain enemy as they could secure. The bodies were generally carefully cleaned and dismembered for cooking, but sometimes when the feast was on a large scale and there were many victims they were cooked whole.

Death was usually administered by clubbing on the head, the chiefs and leading men taking the privilege of killing the victims. At other times the prisoner was run violently against a tree or stone, and his skull so fractured. In the island of Bau, in Fiji,

opposite the chief landing place, I have seen a natural column of igneous rock (a quartziferous felstone porphyry), which was brought from the island of Kadavu and set up where it now stands and used for killing prisoners. The prisoner was taken by a man on each side and run with violence against the stone, death being, of course, immediate.

A human body prepared for the feast was called *bokola*, and when baked entire the body was called *boto-alai*. The expression *kaisi bokola* or *kaisi botoboto*, meaning a common person only fit for eating, was about the most opprobrious epithet that could be applied to a person, and was as strongly resented by a Fijian as calling him *burra soor*, or "great pig," is by an Indian Mahometan.

It was quite usual for members of the lower orders, called *kaisi*, who were, in fact, semi-slaves, to be killed in order to furnish *bokola* for the ovens when occasion required a feast and a sufficient number of prisoners were not forthcoming. In like manner on the death of a chief not only were the widows always strangled and buried with him, but numbers of *kaisi* were also killed, in order that the chief might have a retinue befitting his rank when he entered the Fijian *lomalagi*, or heaven.

In cutting up and portioning the bodies a great deal of etiquette was observed. The operation of preparing the bodies for cooking was performed by an individual called *Dua tava tamata*—"the carver of men." The implements used were splinters of sharp bamboo and hard wood and sharp-edged bivalve shells. The head was cut off and the body disembowelled. It was then very skilfully and neatly dissected, the limbs being dismembered at the joints, while the trunk was cooked entire.

The different parts so prepared were then wrapped in the leaves of a plant specially cultivated for the purpose, the *Mala Waci* (*Trophis anthropophagorum*), and were then ready for cooking. The ovens in which the flesh was cooked consisted of holes dug in the ground, in which a fire was lighted, and numbers of stones of a convenient size heated in the fire. When sufficiently hot, the ashes were removed and a portion of the stones lifted out. The flesh to be cooked was then, with its leaf wrapping, laid on the hot stones in the oven, and the other stones placed on top. More leaves of the *Mala Waci* were then spread on top and a little water poured in to generate some steam and assist the cooking process. The whole was then closely covered up with earth or turf and allowed to stand for an hour or two until sufficiently cooked. Sometimes the impatience of the cannibals would not allow them to wait, and the flesh would be devoured raw, or dragged half-cooked from the ovens. These ovens were at times of enormous dimensions, as may be imagined when at some great feasts several hundred victims have been cooked at one time. The head was

the special perquisite of the chiefs, the brains being considered a delicacy. Prisoners have been known to be shoved alive into the hot ovens and clubbed by their savage captors on endeavouring to escape from contact with the heated stones.

On one occasion the fierce old Bau king, Tanoa, father of the late King Cakabau, had taken umbrage at something which a cousin of his own, himself a powerful chief in an adjacent island, had done. Tanoa organized a war party to go and take revenge. Meantime his kinsman got alarmed and came himself, humbly bearing a *tabua*—whale tooth—as an emblem of submission. This did not mollify the old tyrant, who seized his unlucky relative, deliberately cut his arm off at the elbow and drank the blood that flowed from the wound, then cooked and ate the arm before the eyes of its owner, who was then disembowelled while still alive, cooked and eaten.

A favourite exploit of Tanoa's was to go away with his fleet of canoes on a raiding expedition amongst the islands, pillage and burn the villages, bringing back prisoners and dead to fill the ovens. It is related of him that he would also extort children as tribute from their parents, and come back from his expeditions with the bodies of infants hanging from the yardarms of his canoes. In expeditions such as these the return of the warriors was announced by the loud booming sound of the war conchs, or large shell trumpets.

The fruit of the *Boro Dina* (*Solanum anthropophagorum*, Seeman), a red fruit just like a fair-sized tomato, was commonly eaten with the *bokola*. The leaves of a plant called *T'adau* or *T'udano* (*Omalanthus pedicellatus*, Bentham), were also specially reserved to be eaten with human flesh.

Bokola was the only article of food which could not be lifted with the hands when eaten, as it was if so treated supposed to cause a skin disease. Special forks were kept for this purpose, and used for nothing else. As in the case of other objects which were highly prized, the *bokola* forks were elaborately carved and ornamented, and known by individual names.

Only the bodies of the slain were eaten, those who died naturally being buried, but little scruple was shown in digging up bodies of members of hostile tribes which had been buried. It is stated by reliable observers that bodies so much decomposed as to have to be removed piecemeal from the graves were even devoured, and as they could not be cooked in the usual way were made into puddings. From fear of desecration of this sort, every precaution was taken in burying the dead to choose the most inaccessible places, and to make the graves very deep. In times of danger, also, watch was kept at the grave for a considerable period after burial.

I have stated before that all events of note were marked by

bloodshed and cannibalism. The various stages in the building of a temple, or of a chief's canoe or house, were celebrated in this way. When the canoe was launched numbers of captives were frequently laid down and the canoe dragged to the water over their bodies, the miserable victims being afterwards clubbed, cooked, and eaten. Of course, appropriate *mêkê-mêkés*, or dances, accompanied all these observances, and, indeed, were an indispensable part of the proceedings. The incessant beating of the large wooden *lali*, or drum, made by hollowing out a thick short log so as to form a deep trough-like vessel, announced plainly to all around the progress of the feast. In every case the men only were allowed to eat the *bokola*, it being strictly *tabu* or forbidden to women and children.

Within so recent a period were cannibal practices in force that most elderly Fijians now living have participated in, or been present at them, while some of them acquired considerable notoriety for the persistence with which they clung to the custom. It does not appear that cannibalism was followed to an equal degree in all districts of the islands; indeed, some parts seem to have had an abhorrence of the custom, and to have refrained from it, whilst in others it was very firmly rooted. In conversing with some old men who, in their time, have taken a very active part in cannibal proceedings, I have asked about the custom, and generally they displayed perfect nonchalance in speaking of it, much as we would speak of any very ordinary proceeding. Some of them seemed to feel a lingering regret that such good old days had passed away. I asked one old Rewa River *ratu*, or chief, which part of the body was the best. He said the forearm and the upper arm, and also made dumb show of picking the fingers, and said they were "*sa bula vinaka*," or very good indeed. Taking a fork, which I had, in his hand, he showed me the method of handling it, pressing it into an imaginary piece of flesh and conveying it to his mouth, all the time gazing at me quite cheerfully with his wicked-looking old eyes. He then admired the fork, and said it was nicely carved, and wanted me to give it to him. Another Rewa River *ratu*, the descendant of a race of powerful and renowned chiefs, told us of an exploit of his early days, when he and another man went out on an expedition. Approaching a village cautiously they saw a number of girls bathing; he rushed down, killed one by a blow on the head with his club and cut her head off, which he took back with him. This old chief's house was the last in Fiji, as far as I know, to be built *vaka viti*, or with full Fijian rites. In addition to the usual cannibal observances it was customary to bury a man at each of the main posts of the house, the man's arms encircling the post. This was actually done in this case, and the skeletons of the unfortunate victims now lie in the ground with their bony arms

around the posts. I have sat and drank *yaqona*, or *kava*, the characteristic beverage of the South Sea Islands, in this house, and conversed with the owner, but for a Fijian he is exceedingly taciturn and unsociable.

In eating *bokola*, as I have before mentioned, a special fork reserved for the purpose was used. Care was also taken not to allow the flesh to touch the lips, the piece on the fork being put well into the mouth and caught with the teeth. It was supposed that excessive eating of human flesh caused the inside of the mouth to become luminous in the dark.

(To be continued.)

REVIEW.

"*Handbook of the Flora of New South Wales,*" by Charles Moore, F.L.S., M.R.B.S.L., &c., assisted by Ernest Betche. Cr. octavo, pp. xv. and 582. Sydney, 1893.

THE distinguished Director of the Botanic Garden of Sydney has ever since his access to office in 1847 been eager to provide a special volume, descriptive of the plants indigenous to the wide territory of New South Wales; and he now places the results of his well nigh half a century's labours in phytographic researches before his fellow-colonists and others interested in the vegetation of the oldest Australian province. The appearance of this special "Flora" comparatively late has had one great advantage: the work can thus claim completeness to a very large extent, as the future accession of species of plants, additional to those treated in this volume, can now no longer be large. The book, as in all ordinary cases of this kind, deals exclusively with the vascular plants. The indigenous vegetation of New South Wales is remarkably rich, because it includes plants of alpine and even glacier-regions, of desert-tracts and subtropical jungles, forming a flora now known to contain 3,353 well-marked indigenous species of phanerogamous plants and ferns out of the 9,025 of universal Australia (New Zealand excluded); therefore the number of species of New South Wales is more than three times as large as that of England, Scotland and Ireland, and even not very much exceeded by the flora of Queensland or that of extra-tropic Western Australia, as far as Melbourne researches have hitherto revealed its proportions.

As in synoptic works, such as this from Mr. Moore, the descriptions can be but brief and the records of occurrence only be general, in order to press the vast literary material into one handy and inexpensive volume. We find the definitions clear, terse and not over-concise, as extensiveness in these respects can

be attained only in greater and therefore more costly "Floras," such as Bentham and Mueller's "*Flora Australiensis.*" The descriptions are rendered in a particularly modified dichotomy, admitting of finding out quickly the name of any order, genus or species. The systematic arrangement is according to the simplified Jussieu—De Candolle system, as partly effected long ago by Achilles Richard, and in latest times carried further by F. v. Mueller. Indeed the drift of thought in recent systematizing on phanerogamous plants tends to limiting the incongrous monochlamydous division to the Gymnosperms, distributing its various ordinal constituents among the other dicotyledonous families, a tendency happily followed by Mr. Moore and commenced already with Brongniart and variously continued up to the most recent times by Jean Mueller—(even one of the Floras of the Colonial Series, that by Prof. Grisebach on the British West-Indian Islands, being written on these more novel principles). Mr. Moore has wisely not encumbered his Flora with foreign elements, inasmuch as presenting also the immigrated plants disturbs the originality of the picture of any indigenous vegetation to be unfolded; so in his work he limits the record of the introduced plants to a simple list of names, the characteristics of these kinds of plants being with the utmost of ease found out from British home-works, anywhere readily available. The exclusion alluded to has another advantage; it admits of the possibility of finality in a flora, whereas such works must ever remain incomplete, should permanently immigrated weeds or garden- or field-fugitives become regarded as constituents of any "native flora." It is a merit also of this new Australian phytographic volume that the author did not feel himself bound by long usage to exclude organographic improvements; so for instance he employs the term "*ovulary*" in consonance with that of ovules, instead of the word ovary, which should remain with many other botanic terms exclusively zoographic.

For the difficult task, accomplished by the publication of this work, Mr. Moore has had during the last dozen years the meritorious aid of Mr. Betche, who shared assiduously both in the work of the field and study-room. An historic sketch of the progress in the knowledge of New South Wales plants is given, so also from B. D. Jackson's records, a list of botanic authors quoted, further an explanation of generic and specific names, and a full organography. This valuable book should therefore in every respect fulfill the expectations raised, and promote vastly and permanently knowledge of the lovely and grand vegetation of New South Wales, whether for educational or industrial or recreative aims. The print, paper, and binding are exquisite, and thus due praise should also be accorded to Ch. Potter, Esq., and his staff at the Sydney Government Printing-office.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part I.

As so little has been done towards compiling a systematic list of Victorian moths, I am pleased to be able, with the consent of the committee of the Field Naturalists' Club of Victoria, to present a first instalment of such a list, to be continued at intervals until completed. I am well aware, in undertaking the subject, that it must necessarily fall short of all requirements; but that it will prove of some use to Victorian lepidopterists is my sincere desire. What I wish is to make it useful as a guide to the arrangement of our species, besides giving references, synonymy (where necessary), and localities where they have been met with. I regret being unable, through the want of proper literature, &c., to give references in all cases. It is a deplorable fact that we have very few working entomologists in our midst, and it is with the hope of creating greater interest in this branch of natural history that I am writing on the subject. We have in Australia groups of most wonderfully interesting insects, which will well repay any entomologist who will trouble to examine their peculiarities of structure, &c. Perhaps it would be as well to mention here that I shall be most happy to assist any collectors in the identification of species entrusted for determination, and would return all specimens where so desired.

In compiling this list, I have to acknowledge my indebtedness to Messrs. Geo. Lyell, jun., of Gisborne, a most enthusiastic and energetic correspondent; J. A. Kershaw, of Windsor; Frank Spry, of South Melbourne, and other friends, for their kindness. To the two first named gentlemen I am specially indebted for their indefatigable promptitude in replying to queries, loan of specimens, &c.

It has been pointed out to me that few of our entomologists confine themselves to Victorian species, so I include the other known Australian genera in italics to make the list more complete and show the relative positions of each. The genera and species are arranged in natural sequence, following in the main the admirable arrangement of that eminent lepidopterist, Mr. E. Meyrick, B A., F.E.S. Some of the species I have not seen, but are enumerated on the authority of Walker, Rosenstock, and others. It is a rather difficult matter to decide what insects are entitled to be included, as most of the older authors simply gave the locality as New Holland. This applies more especially to the Bombycina and Noctuina. The last few remarks are written with the object of conveying the value of correctly labelling *all* captures with their proper data. In conclusion, I would state that any criticisms, corrections, or additions will be thankfully received and acknowledged in their proper place. Those species marked with an asterisk (*) are now recorded from Victoria for

the first time. On completion of the whole group I will give an additional supplementary list of those species which I had overlooked, &c.

Order—LEPIDOPTERA.

Section—HETEROCERA.

Family—CASTNIIDÆ.

SYNEMON. Dbldy.

1. S. SOPHIA, White (Grey's Exped. Aust., app., 474, f. 7; Dbldy., Lort's Disc. Aust., app. i., 516; Walk., B. M. Cat., i., p. 54).
2. S. PLANA, Walk. (B. M. Cat., i., p. 37).
   Victoria, Western District.
3. S. LÆTA, Walker (B. M. Cat., i., p. 36, 1854).
   Victoria, Western District.
4. S. HESPEROIDES, Feld.
   Victoria, Craigieburn.

Family—AGARISTIDÆ.

I here append the Agaristidæ, which I am of opinion is truly referable to the Noctuina, but as this group (*i.e.*, the Noctuina) is so inextricably mixed, I will content myself by following the usual method, and arrange them here.

ÆGOCERA. Latr.

AGARISTA. Leach.

5. A. AGRICOLA, Don (Ill. Aust. Ins. Lep.; A. picta, Leach, Zool. Misc., i., p. 15; Godt. Enc. Meth., ix., 1803; Duncan, Exot. Moths, xxxvi., 83, pl. 2, fig i.)
6. A. CASUARINÆ, Scott.
7. A. GLYCINE, Lew. (Ins. N.S.W., ii., pl. i., Phalænoides, G.; Agarista glycinæ, Bdv., Voy. *Astrolabe*, pl. i., Lep., 175).
   Gisborne, Melbourne, &c.
8. A. EPHYRA, Walk. (B. M. Cat., i., p. 42).
   Gisborne, Melbourne, Healesville, &c.
9. A. LEWINII, Bdv. (Voy. *Astrolabe*, pl. i., Lep., 176).
   Gisborne, Myrtleford, Sale, &c.
10. A. DONOVANI, Bdv. (L. C. 176–7, Feist, Voy. de *La Favorite*, v., supp. 22).
11. A. LATINUS, Don. (Papilio latinus, Ins. N. H., Bdv.; Agarista latinus, Voy. *Astrolabe*, p. i., Lep., 174, 4).

DAMIAS. Bdv.

HECATESIA. Bdv.

12. H. FENESTRATA, Bdv. (Mong. Zyg., ii., pl. i., f. 2 ; Grey, Exp. Aust., app., 415, 8, f. 2 ; Swain, Ill. Zool., 2nd ser., pl. 116).

13. H. THYRIDION, Feist (Voy. de *La Favorite*, v., supp. 19, pl. 5, f. i. ; White, App. Grey's Exp. Aust., 475).

FAMILY—SYNTOMIDIDÆ.

AGAPHTHORA. Meyr.

HYDRUSA. Walk.

*14 H. APERTA, Walk. (Syntomis aperta, B. M. Cat., supp. 72 ; Meyr., Proc. Linn. Soc. N.S.W., 783, 1886).

*15 H. ANNULATA, F. (Zygæna annulata, F. E. S., 389; Hydrusa cingulata, Butler, Jour. Linn. Soc., 352, 1876; H. nigriceps, *ib.*; H. annulata, Meyr., Proc. Linn. Soc. N.S.W., 783, 1886).

*16. H. NESOTHETIS, Meyr. (Proc. Linn. Soc. N.S.W., 783, 1886). Gunbower.

CHOROMELES. Meyr.

EUCHROMIA. Hb.

FAMILY—ZYGÆNIDÆ.

PROCRIS. F.

17. P. DOLENS, Walk. (Bomb., 112, Meyr., Proc. Lynn. Soc., N.S.W., 791, 1886).
Macedon, Melbourne, Gunbower, &c.

18. P. CORONIAS, Meyr. (Proc. Linn. Soc., N.S.W., 792, 1886).
Macedon.

19. P. SUBDOLOSA, Walk. (B. M. Cat., supp. 62 ; Meyr., Proc. Linn. Soc. N.S.W., 793, 1886).
Melbourne, Oakleigh.

*20. P. APICALIS, Walk. (Bomb., 111 ; Pollanisus sequens, *ib.*, 115; Procris Nova Hollandiæ, Wallg. Wien. Ent. Mon., 1860, 39; Meyr., Proc. Linn. Soc., N.S.W., 794, 1886).
Melbourne.

21. P. VIRIDIPULVERULENTA, Guer. (Mag. Zool., pl. xi., 3, 1839 ; Meyr., Proc. Linn. Soc. N.S.W., 794, 1886).
Melbourne, Gisborne, &c.

*22. P. AMETHYSTINA, Meyr. (Proc. Linn. Soc., N.S.W., 927, ? 1887).
Melbourne.

HESTIOCHORA. Meyr.

23. H. TRICOLOR, Walk. (Bomb., 111 ; Meyr., Proc. Linn. Soc., N.S.W., 788, 1886).
Gisborne, Melbourne, &c.

Group—SPHINGINA.

FAMILY—SPHINGIDÆ.

SUB-FAMILY—MACROGLOSSINÆ.

HEMARIS. Dalm.

MACROGLOSSA. Ochs.

SUB-FAMILY—CHÆROCAMPINÆ.

ACOSMERYX. Bdv.

PANACRA. Walk.

CIZARA. Walk.

CHÆROCAMPA. Dup.

24. C. CELERIO, Linn. (Sphinx celerio, Linn., Syst. Nat., 1, 2, p. 800, n. 12, 1767).

25. C. SCROFA, Bdv. (Deilelphila scrofa, Bdv., Voy. *Astrolabe*, Lep., p. 185, n. 3, 1832).
Gisborne, Melbourne, &c.

*26. C. EROTUS, Cram. (Sphinx erotus, Cram., Pap. Ex. iii., t. 104, f. 13, 1779)

DEILEPHILA. Ochs.

SUB-FAMILY—AMBULICINÆ.

AMBULYX. Westw.

SUB-FAMILY—SMERINTHINÆ.

CÆQUOSA. Walk.

27. C. AUSTRALASIÆ. Don. (Sphinx australasiæ, Don. Ins. N. H., f. i., 1805; Brachyglossa banksiæ, Bdv., Sp. Gen. t. 33, Het., i., p. 11, t. 27, f. i., 1874).

SUB-FAMILY—SPHINGINÆ.

PROTOPARCE. Burm.

28. P. CONVOLVULI, Linn. (Sphinx convolvuli, Linn., Syst. Nat. 1, 2, p. 798, 1767 ; Sphinx rosei-fasciata, Koch, Ind. Aust. Lep. Faun., p. 54, 1873 ; Scott, A. S. M. S. S.)

MACROSILA. Walk.

NEPHILE. Hb. (Zonilia, Walk.)

(To be continued).

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., LL.D., F.R.S.

(Continued.)

Acacia Howitti.

Viscidulous; branchlets slender, flexile, streaked, short-pubescent; phyllodes small, sessile, curved-lanceolar or verging into an ovate form, longitudinally few-venulated, densely ciliolated, short-mucronate or only apiculate, almost glabrescent except at the margin, their secondary venules faint and partly reticular, their glandule almost obliterated; stipules broadish, very short, membranous; headlets of flowers small, axillary, solitary or sometimes two together on velutinellous peduncles of from equal to double length; flowers in each headlet not very numerous; bracts mostly lanceolar- or rhomboid-cuneate; calyx bluntly and coherently five-lobed, as well as the corolla beset with short hairlets outside; fruit rather short and narrow, much compressed, hardly curved, imperfectly and then slightly constricted between the seeds, ciliolated but otherwise glabrescent; seeds placed longitudinally, oval-ellipsoid, compressed, shining-black, the areole on each side long; strophiole pale, hardly folded, thrice or less shorter than the seed.

At Yarram-Yarram on Bodman's Creek, also in Glen Falloch; A. W. Howitt, Esq.

Phyllodes chartaceous, dark-green, mostly ½-¾ inch long. Peduncles much shorter than the phyllodes. Fruits to 2 inches long, to ¼ inch broad, the valves of thin texture. Length of seeds hardly ¼ inch. The form of the phyllodes is that of A. buxifolia (to which *A. hispidula*, Cunn. in Hook. "Icon. Plant." 161, now Willd., seems closely allied); but our new plant is in almost every other respect very different. Among the Plurinerves it approaches to some extent the equally viscidulous *A. ixiophylla* and *A. montana;* both, however, belong to the inlands desert-region, not to the silvan mountain-tracts of the coast-country; besides the phyllodes of *A. ixiophylla* are very dissimilar in form and venulation, the sepals disconnected and the fruits crisped. *A. montana* (never truly a mountain-plant) possesses longer and blunter phyllodes with only two primary venules, fruits much beset with hairlets and seeds with a more folded funicle. A. Howitti shares the climatic conditions conducive to *A. subporosa*, and notwithstanding the very much shorter and conspicuously ciliolated phyllodes and the also much less developed strophiole, comes nearest to that species. Mr. Howitt observes that the height of any of the plants seen by him did not exceed 15 feet.

Field Naturalists' Club of Victoria.

President:

PROFESSOR W. BALDWIN SPENCER, M.A.

This Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor, Mr. F. G. A. Barnard, Kew.

Most of the numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Rev. W. Fielder, St. Kilda, at sixpence each; or in sets. Vol. I. (1884-85), 16 numbers, 7s. 6d.; Vol. II. (1885-86), 12 numbers, 6s.; Vol. III. (1886-87), 12 numbers, 6s.; Vol. IV. (1887-88) out of print; Vol. V. (1888-89), 12 numbers, 6s.; Vol. VI. (1889-90), 12 numbers, 6s.; Vol. VII. (1890-91), 12 numbers, 6s.; Vol. VIII., 12 numbers, 6s.; Vol. IX., 12 numbers, 6s.; each set with title-page and index for binding.

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The Author of each article is responsible for the facts and opinions he records.

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THE

Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday evening, 8th May. Mr. C. Frost (one of the vice-presidents) occupied the chair, and there was an attendance of about fifty members and friends.

REPORTS OF EXCURSIONS.

Reports of recent excursions to Keilor (8th April) and Oakleigh (22nd April) were received from Mr. C. G. W. Officer, B.Sc. (see page 21), and Mr. H. P. C. Ashworth, who acted as leaders on those occasions. The latter reported good weather but moderate attendance, and owing to time of year specimens of interest were scarce. Among plants, *Styphelia scoparia* and *S. humifusa* were obtained in flower, also the orchid *Eriochilus autumnalis*, the tubers of which seemed to have been able to withstand the summer fires. The curious ferns *Schizæa fistulosa* and *S. dichotoma* were found. Among birds, *Ephthianura albifrons*, *Petræca phœnicea*, also imported Goldfinches and Thrushes, were noted.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported a good attendance at the meeting for practical work held on Monday evening, 24th April, when Mr. Frank L. Baker dwelt at some length upon "Photo-Micrography." When it is stated that Mr. Baker is an enthusiast in this subject it will readily be understood that the advantages of this means of presenting the beauties and intricacies of structure in natural history specimens were enthusiastically set forth. Then followed detailed descriptions of apparatus used and methods employed, reference being made to the best kinds of microscopic stands and accessories to use, together with definite directions as to focussing and amount of exposure required to produce satisfactory photographs of objects mounted under different conditions. Valuable hints and formulæ were also given for developing the plates after the image had been obtained. At the close of an exhaustive paper Mr. Baker photographed a slide of selected diatoms, thus practically demonstrating the methods set forth in the paper. Photographs of previous labours in this field were distributed to members as souvenirs of an interesting meeting.

LIBRARIAN'S REPORT.

The hon. librarian reported the following donations to the library:—"Proceedings of the Linnean Society of New South Wales," 2nd series, vii., 4 (from Society); "Journal of Pharmacy," April, 1893 (from Society).

ELECTION OF MEMBER.

On a ballot being taken, Dr. Moore, of Dandenong, was elected a member of the Club.

DEATH OF AN EMINENT BOTANIST.

Baron von Mueller, one of the patrons of the Club, read a letter received a few weeks ago from Alph. de Candolle, son of the celebrated botanist, Aug. Pyramus de Candolle. The letter had a mournful interest, since it proved to be the last one of a correspondence with Baron von Mueller extending over 40 years, news being received by the last mail of the death of Alph. de Candolle at the age of nearly 90 years. During almost the whole of his career he devoted himself to scientific work, botanical studies having the greatest weight with him. He was a unique authority on the nomenclature of plants. One of his works alone includes 30 volumes, and his monograph on the origin of cultivated plants takes rank with the best botanical treatises. At the close of a touching address, in which Baron von Mueller bore testimony to the loss which the scientific world had sustained by the death, a vote of condolence with the surviving son, Casimir de Candolle, was passed by the Club, the members standing in silence whilst it was being passed, out of respect to the memory of the eminent botanist.

PERMANENT RESERVATION OF THE DANDENONG STATE FOREST.

Mr. J. B. Gregory, LL.M., then referred to the action of the Minister of Lands in throwing open for selection the central portion of the Dandenong State Forest, and moved—"That a committee be appointed to take steps as may seem necessary to induce the Government to refrain from revoking the reservation of the Forest." This was seconded by Mr. F. G. A. Barnard, Messrs. G. Coghill, J. Shephard, and the Secretary also speaking strongly in favour of it, whilst Messrs. E. Anderson, C. French, and H. R. Hogg deprecated any action being taken likely to hamper the hands of the Government in dealing with the settlement of people on the land. The proposition was then put to the meeting and a show of hands resulted in equal counting. The chairman, however, gave his vote against the motion, which was declared lost. Mr. Gregory, on the ground that some non-members had voted, claimed a division, which ended in the reversal of the previous result by a fair majority, and the proposition was, therefore, declared carried. In accordance with it, Messrs. F. G. A. Barnard, J. B. Gregory, and Rev. W. Fielder

were appointed a committee, with power to add to their number, to formulate details in connection with a deputation to the Minister of Lands on the subject.

[The sub-committee, having gained the co-operation of the Royal Society, asked the Minister of Lands to grant them an interview, and, accordingly, a combined deputation waited on the Hon. J. M'Intyre, at the Lands Department, on 17th May, and proceeded to state their reasons why the proposed settlement in the Dandenong State Forest should not take place. They were, however, informed by the Minister that scientific theories in mining matters having proved, in some cases, incorrect, he could take no notice of such theories with reference to denudation of forests, rainfall, &c., and that the æsthetic aspect of the question could not be entertained.

Another deputation from residents of the surrounding districts, with reference to conservation for water supply purposes, has met with similar treatment.—Ed. *Vict. Nat.*]

PAPERS.

Only a short time remained for reading the four papers which had been accepted by the Committee for this meeting, and it was eventually decided to take two of them as read, in view of early publication in the *Naturalist.*

1. By Mr. C. French, F.L.S., entitled, "Notes on a New Victorian Injurious Insect," with description by Mr. G. B. Buckton, M.A., F.L.S. The ravages of this remarkable insect (closely allied to the Cicadæ) have been long known to orchardists, but the precise cause has only lately come to light through the investigations of Mr. French. Its natural home is the wood of the young eucalypti, but of late years it seems to have sought out more palatable food in some of our orchards. Its presence upon the trees may be easily observed, since it lays its eggs, from six to eight in number, in small punctures so close together that the tree is perfectly riddled with holes, the apertures, after the deposition of eggs, being closed with white flocculent matter. Mr. French counsels severe pruning when the tree is dormant, the prunings to be immediately burnt. The stem and larger branches should then be painted with a mixture of lime, sulphur, and soft soap, whilst the smaller branches should be sprayed with kerosene emulsion and resin compound, put on the trees whilst hot. The scientific description and other matters connected with its ravages will be published in part iii. of "Destructive Insects of Victoria," which will shortly be issued by the Department of Agriculture under the supervision of Mr. French.

2. By Mr. F. L. Billinghurst (communicated by Mr. T. S. Hall, M.A.), entitled, "Notes on the Land and Freshwater Mol-

lusca of Castlemaine and Neighbourhood." The hunting grounds of Mr. Billinghurst embraced a radius of sixteen miles, including the granite ranges of Harcourt and Mt. Alexander, the reservoir at Expedition Pass, Mt. Franklin, and the neighbourhood of Yandoit. No less than ten species, named by Dr. Cox and Mr. C. Hedley, were described, of which *Charopa Tamarensis*, found in the crater of Mt. Franklin, and hitherto only described from Launceston; *Limnæa Brazieri*, a species of rare occurrence in New South Wales; and *Amphipeplea papyracea*, also recorded from Merrigum by Mr. J. F. Bailey, were of the greatest interest. The common garden snail (*Helix aspersa*) abounds at Castlemaine, being let loose by some enthusiasts, "because they reminded them of home." Mr. Billinghurst remarks that horticulturists generally utter murmurs "loud and deep" at their depredations, and bewail the good old times when peas flourished luxuriantly without their presence.

EXHIBITION OF SPECIMENS.

The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Messrs. E. Anderson and F. Spry.—Life-history of three rare Victorian butterflies—*Ogyris olane* (Hew.), *O. abrota* (Hew.), *Hypochrysops delicia* (Hew.); eggs, larva, and chrysalis of *Lampides bœticus* (Lin.); eggs of *Delias harpalyce;* larva of *Pieris teutonia*. By F. G. A. Barnard. —Curious accumulation of twenty years' bark from a red-gum tree, obtained near Kew; lichens from Keilor excursion. By A. Coles.—Gallinaceous Parra; Flame-breasted Robin (*Petrœca phœnicea*), supposed to have died from eating toadstool as exhibited. By C. French, sen.—Collection of Goliath Beetles (exotic); seven species of Australian longicorn beetles (genus *Batocera*); Australian Sphingidæ, or Hawk Moths. By C. French, jun. —Five species of Australian Quail eggs. By H. Giles.—*Cyclodus nigroluteus* (Southern Blue-tongued Lizard), female, with four young (27 days old). By Mr. H. F. Hill.—Case of Rhopalocera, including *Holochila heathi*, Cox, from Gordons. By Mr. J. A. Kershaw.—Set of four eggs of *Parra gallinacea* (Comb-crested Parra), from New South Wales. By Baron von Mueller.—*Fagus moorei*, F. v. M., from South Queensland; *Acacia howitti*, F. v. M., new to science, collected in Gippsland by A. W. Howitt, Esq.; *Crotalaria dissitiflora*, Benth., from Barcoo—supposed to be poisonous; acorns of *Quercus ægilops*, L., Valonia Oak, cultivated at Castlemaine by Mr. G. Cunnack; *Athrixia stricta*, var. *albiflora*, from Israelite Bay, W.A., collected by Miss Brookes. Victorian Department of Agriculture (Entomological Branch) — Specimen number of new work on Australian Lepidoptera, by A. S. Olliff and Miss Scott (Australian Museum Publications), parts i., ii., iii.; coloured illustrations.

EXCURSION TO KEILOR.

This excursion was timed to leave Spencer-street by the 12.15 train on Saturday, 8th April, but at the appointed hour only three members put in an appearance. The day was a beautiful one, on which a fair attendance might have been reasonably expected. However, nobody else appearing, the three set out, and after a twelve miles run found themselves at St. Albans, a solitary hamlet on the Keilor Plains. From here we walked in a north-easterly direction to a tributary creek of the Saltwater River, noting the vesicular and slaggy appearance of the basalt in many places. Owing to the columnar structure and ball and socket joints of the basalt the ground is often strewed with loose masses of rock. The creek, which does not appear to be named, is crossed by a road to Keilor a short distance above its junction with the Saltwater River. The valley is typical of the many similar ones that traverse these plains, being about 250 ft. or 300 ft. deep. Walking along the right side of the valley, before coming to the road mentioned, we noted an outcrop of a yellow, earthy limestone, capped by grit and a very hard white quartzite. This limestone, which was the object of our visit, is traversed by numerous veins of limonite, which very often assumes a concretionary form. On examining this limestone more closely we found it to contain a quantity of Polyzoa and Echini spines. Some imperfect casts of Lamellibranchs were also observed. This deposit has been put down as of Pliocene age. A little further on we came to a section exposed on the side of the road close to the bridge across the creek. The succession here, beginning at the bottom, is first basalt, much jointed and much decomposed. This is overlaid by the Pliocene deposit before mentioned, and this again by the basalt forming the surface of Keilor Plains. The lower basalt is what is known as "Older Volcanic," and up till recently has been considered as probably of Miocene age. However, Mr. G. B. Pritchard has lately shown that a basalt occurs at Portarlington which is overlaid by deposits of undoubted Eocene age; so it is quite possible, even probable, that the basalt we are considering is older than Miocene. In the sedimentary deposit overlying this the gradual change from a quartzitic grit to a fine-grained, almost crystalline quartzite can be well seen, the change having been probably brought about by the overlying basalt when it poured in molten floods over the country. This upper basalt—Newer Volcanic, as it is called—has been set down as of Pliocene age, and Murray discusses the probability of its having been spread out under water. This seems to have been the case in some instances, at any rate. I am inclined to think that this Upper Volcanic series will have to be placed further back in geological time. On examining the old cones of eruption about Sunbury and Diggers' Rest one is surprised to find how little of their original structure is

left. They have suffered enormous denudation, and one is led to the opinion that, on this point of denudation alone, both as regards the cones and as regards the basalt flows themselves, that if set down as of Pliocene age sufficient time is not allowed to account for this denudation. We next followed down the creek to the Saltwater, noting the immense quantity of alluvium deposited in the broad valley caused by the junction of the two streams. Several well defined old river terraces were also remarked. A short distance down the Saltwater River an outcrop of Upper Silurian rocks occurs. They consist of finely laminated shales of various colours, dipping at the usual high angles. Graptolites are recorded on the Geological Survey Map (quarter sheet No. 1, N.W., Keilor) as occurring here, but a diligent search for them was unsuccessful. Growing close alongside the stream here was the only plant of interest noted in flower—viz., *Mimulus repens*, R. Br. As it was now getting late we started homewards, noticing on our way numerous species of lichens growing on the basaltic stones, many of which were very pretty, thus ending a most enjoyable and interesting outing, the landscape features of the valleys being alone worthy of notice, especially from a geologist's point of view.—GRAHAM OFFICER.

THE LATE ALPHONSE DE CANDOLLE.

AT the May meeting of the Field Naturalists' Club of Victoria Baron F. von Mueller, K.C.M.G., referred to the death of the above distinguished botanist in the following words:—

MR. PRESIDENT, LADIES AND GENTLEMEN,—A great man of science has passed away, Alphonse de Candolle, at Geneve on the 4th of April! He soon followed Richard Owen, and thus organic natural history in each of its main-divisions lost highly prominent leaders. Both became almost nonagenarians, and both maintained their grand mental faculties unimpaired to the last. Alphonse de Candolle's genius arose under unsurpassed advantages. In his illustrious parent, Augustin Pyramus de Candolle, centred the highest achievements within the science of plants as a whole during the earlier part of this century. Even a grandsire of the elder De Candolle had at the time of Ray and Tournefort as an amateur rendered that name, subsequently so illustrious, already known in botanic science;—thus,—like in the genealogy of the Jussieus, the Gmelins, the Darwins, the Hookers,—also the Geneve great dynasty of phytologists has passed through several generations, so that at the solemn centennial celebration of the Linnean Society one of the two first medals, then bestowed on Alphonse de Candolle by that venerable union of zoologists and botanists, could be received for him by a grandson as his personal representative. Great men

with the feelings of Augustin and Alphonse de Candolle deserve such proud gratification with hopes so cheering for the future! When in 1839 the originator of their worldwide family-fame introduced the next heir of his renown to the empire of science (in the 7th volume of his universal description of the plants of the globe) in offering the Campanulaceæ, it was with the wording "auctore Alph. D. C. dilectissimo filio;"—and when in 1844 the 8th volume of the "Prodromus" had to be issued by the mourning son solely, it was in the following words: "Memoriae suavissimae parentis optimi Alphonsus filius patria vestigia passu licet non aequo persequutus pio animo dedicabat." But Alphonse de Candolle, whose irreparable loss science has now also to deplore, had already stepped youthfully forward with his first independent essay in 1830,—a large monography, requiring years of special previous research; and much earlier indeed he had aided his father in annual notes on rare plants of the botanic garden of Montpellier, where next month also Augustin Pyramus de Candolle's memory will be honoured at the tricentennial jubilee of that celebrated university, of which he was during a series of years in his specialities so great an ornament. De Candolle's "Prodromus" will for all time remain the chief work not only for the specific description of the dicotyledonous plants of the whole earth, but also for the detailed elaboration of the Candollean system; and this again in its main features must remain the scheme of classification for all futurity,—whereas the permanent systematic fixing of the genera in their modern aspect and now vast accumulation has fallen to the share of two British authors, George Bentham and Joseph Hooker. Nearly twenty volumes appeared of this "Prodromus" with the help of the best investigators of each period. Since 1878 this unique work has been followed by ten volumes of miscellaneous monographies of Phanerogams, for which Alphonse de Candolle still furnished the Smilacinæ,—copies of the volumes being successively received by the writer of this necrologe from the author's own hands. To be actually a monographer of whole large orders of plants through half a century stands as an unexampled feat in the annals of science. But he had the further triumph, to see his accomplished son, Casimir de Candolle, make his grand *debût* several years earlier by already monographing the Piperaceæ for the "Prodromus,"—that work throughout being written in Latin for use of all nations in its originality. What endless information, what unceasing delight has been afforded by this grand serial, and will continue to be afforded! The almost unparalleled literary activity of him, for whom we now are mourning, gave further vent to multifarious other productions for the enrichment of science. Thus as early as 1835 he issued his two large volumes, "Introduction à l'Etude de la Botanique," for teaching purposes. Various publica-

tions followed, irrespective of the vast and telling contributions to the "Prodromus." In 1855 appeared his memorable and large work on the geography of plants, involving ample considerations of achievements in sciences collateral to abstract phytology; in this book for the first time and mainly from Melbourne-material the Flora of Central Australia came under comparative consideration and connected review. In 1867 Alphonse de Candolle became the principal legislator for the naming of plants through his "Lois de la Nomenclature de Botanique," then adopted by the International Botanic Congress in Paris. In 1880 came out a special volume on sound rules, how plants professionally ought to be diagnosticised, with multifarious appertaining data as the outcome of sixty years' severe experience of his own. The year 1883 saw appear his "Origine des Plantes cultivées," a monument of studies, requiring reference even to works in the oriental languages; this book again is the result of that extraordinary methodicity, evinced in all his extensive writings, and acquired as a heirloom from Augustin Pyramus de Candolle; it elucidates with infinite patience and rare grasp of mind a number of questions, bearing on this abtruse and complicate rural subject, much buried in far past history and often only to be unravelled from distorted traditions and other unreliable records previously accepted. But Alphonse de Candolle's attention was not limited to what his special callings demanded from him; because his history of the sciences of the last two centuries (1872), therefore of the progress of nearly the whole of newer knowledge through the world, bears witness of the wondrous range of his perceptions and inquiries. With filial piety he devoted the latest of his volumes to reminiscences of Augustin Pyramus de Candolle. What could be more fascinating, than to learn of the personal contact of many bearers of sciences belonging to different centuries? What could be more elevating, than glimpses on the individual and mutual relations of great masters in knowledge through several centuries from the standpoints of such rulers of mental efforts as these two botanic coryphæans? What consolation must it have been to Alphonse de Candolle, when passing away, to see in hopeful brightness these touches in an elder science-world renewed in a younger one by Casimir de Candolle at the verge of a century, through which his two nearest ancestors were so luminous? The vivid interest, displayed by the Genevese phytologic sage in all that concerned his favourite science, remained undiminished to the last. Even within about two weeks of his death he pondered over progressive details for the greatest of his works, as shown by a last communication to the author of these lines, who with pride can look on a series of letters, received from Alphonse de Candolle during more than three decades of time, and who is reminded of similar parting

lines from Lindley, Bentham and others of the foremost in phytology. As an instance of the keen circumspectness and tender solicitude, with which Alphonse de Candolle watched over the scientific welfare of others, it may here be stated, that when one of the Melbourne illustrated works on plants approached its close, he entirely on his own impulse and sole accord, without the slightest knowledge of the author and utterly unsought, addressed himself to the authorities here in terms of appreciation, which by the weight of his mastership could not fail to exercise a beneficial influence for future efforts on this side of the world. That such a man earns the admiration of all the workers in his or in kindred fields, was a triumphant sequence. Homage was paid him from all parts of the world. English science honoured him with the foreign fellowship of the Royal Society. An extensive Australian genus of plants of delicate loveliness bears his name. Few mortals can ever rank with the De Candolles on their own paths of science, indeed very few! Their glorious acquisitions were for rural wealth, for industrial gain, for higher education, for joyful recreation, for elevating contemplations, and above all for solemn religious interpretations! Such then must ever tend to exercise in their own way an incalculable influence on the well-being of the whole world of mortals!

The following is the letter mentioned above:—

Genève, 17 *Mars*, 1893.

Mon cher collègue,—Je profite d'un bon moment pour vous adresser quelques lignes. Mais je suis dans un si mauvais état de santé depuis six mois, qu'il m'a fallu abandonner toutes les occupations. Une attaque d'influenza a été une véritable maladie d'un mois et ensuite a succédé une extrême faiblesse, qui ne peut guère se corriger à mon âge. Je tiens cependant à vous remercier des "Candolleaceous Plants" fasc. I, que j'ai reçu au mois de Décembre. Ces plantes sont fort bien dessinées, et leur variété dans un genre si naturel est remarquable.

Votre portrait montre, que vous êtes toujours bien portant. Vous vivez dans un climat salubre, et il faut espérer, que cela vous maintiendra longtemps dans de bonnes conditions.

Le prochain volume de nos Monographies sera de M. Vesque sur les Guttifères. On en commence l'impression. Il y aura beaucoup de détails anatomiques comme dans les mémoires de M. John Briquet sur les Labiées, mais c'est écrit en latin.

Recevez, mon cher collègue, l'expression de mes sentiments les plus dévoués.

ALPH. DE CANDOLLE.

In Sir William Hooker's "Journal of Botany," IV, 229, is published a letter by Alphonse de Candolle to Mr. Bentham, in the French language, announcing with the saddest of expressions the death of his illustrious father, now 52 years ago.

CANNIBALS AND CANNIBALISM.

By Thos. Steel, F.C.S.

(Read before Field Naturalists' Club of Victoria, April 10, 1893.*)*

(Concluded from page 10.*)*

Amongst the Maoris of New Zealand there is no doubt that cannibalism was practically universal. In the main the customs attendant on its practise greatly resembled those of the Fijians, and considering how closely related are the two races in blood, manners, and language; this is not surprising. Many different traditions were current amongst different tribes regarding the origin of the custom, some of which indicate something of the nature of a religious sacrifice, whilst the bulk of them are tales of simple revenge for real or fancied injuries, which are related in connection with the legendary histories of the mythical ancestors of the Maoris.

With the Maori the great law was the law of revenge. If a man fell sick and died, it was at once concluded that he had been bewitched by some secret enemy, and immediate steps were taken to detect the guilty party. The direction in which an insect would crawl, or some equally trifling indication, was sufficient to show the direction from whence came the injury. Should it chance that in that quarter lay the *pah*, or village, of a rival tribe, the evidence was considered clear; otherwise, probably the first individual met with in that direction would be assumed to be the offender. A life was always sought for a life. If a man was killed, in a fight or otherwise, *utu*—revenge, or equivalent—must be sought by his friends, and in turn the friends of the man thus taken as *utu* would seek a like recompense. Thus the seeking of *utu* became a hereditary matter. A son might not have an opportunity of revenging the killing and eating of his father or brother, but the solemn charge would be handed down, and in this manner sometimes several generations might pass before full and satisfactory *utu* was obtained for a long past injury. Frequently nothing but the complete extermination of a tribe would end a hereditary dispute of this kind. When a man had been killed and eaten it became the most sacred duty of his nearest relatives to kill and eat the party who had so wronged them, or if this could not be done, to treat some member of his family, or some relative, or even only a member of his tribe, in like manner.

As in the case of the Fijians, women were not allowed to partake of the cannibal feast except in some rare cases, such as when a woman chanced to be the sole survivor of a chief's line, and as such became entitled to partake of the flesh of those slain in battle as *utu* for her race. It was the special privilege of those having relatives killed in a battle to kill the prisoners captured.

This was done by women as well as by men, and even children were taught to club the bodies of the slain foes.

Chiefs frequently reserved entire bodies of rival chiefs for their own private consumption, and not unfrequently prided themselves on the number of whole bodies which they had eaten in this way, The eyes and the brain were especially prized as possessing particular virtues, and it was the sweetest revenge to swallow the brain and eyes of an enemy. The souls of those eaten were supposed to wander about in a disembodied state, and never to reach the Maori heaven.

It might frequently happen that blood relations were members of tribes at enmity with one another, but such were never eaten. It would have been considered in the highest degree disgraceful for a man to eat of one related to him, though he might kill him without any compunction.

Unlike the Fijians, it was not customary amongst the Maoris to take the bodies to their villages, as doing so would have rendered the place as well as the people *tapu*. The feasts were celebrated either on the field of battle or outside the villages, and as touching or partaking of a human body rendered a person very highly *tapu*, the ceremony of removing the *tapu* was performed by the priests after the close of the feast.

The Maori cannibal ovens, called *kapura* or *umu*, and the mode of preparing and cooking the bodies, were practically identical with those of the Fijians. The curious custom of eating different sorts of food in an advanced state of decay was followed by the Maori. I have already referred to the Fijians being addicted to eating bodies in this condition. The Fijians also make a sort of pudding by placing cooked bread-fruit, bananas, and other ingredients in a large hole in the earth, and covering up like a *silo* for some months. When opened the smell is most repulsive to a European, but seems to be highly grateful to Fijian senses, and the pudding is considered a great delicacy and is eagerly devoured.

Amongst the Maoris the killing of victims for the oven was by no means confined to ordinary enemies. Slaves were killed with little or no compunction when occasion required, and frequently, on very slight grounds of provocation, lower class members of the tribe would be clubbed by a chief for some petty offence, and the body eaten in the usual way, the occasion being made to suit the opportunity.

Cooked joints, carefully packed in baskets of leaves, were sent as choice presents to friends residing at a distance.

The Maoris were exceedingly cruel in their treatment of prisoners and adepts at inflicting torture, and they did not hesitate to exert all their ingenuity on their captives. Nothing would induce a Maori to evince any sign of feeling even under the

greatest pain, the chiefs in particular displaying this form of self-control to an extraordinary degree. No matter what was done, the tattooed features of the warrior would remain stolid, grim, and impassive until death relieved him of his torments, or he would reply with scorn to the taunts of his oppressors, defying them to do their worst. In the words of the poet—

> " The captive cannibal, weighed down with chains,
> Yet braves his foes, reviles, provokes, disdains ;
> Of nature fierce, untamable and proud,
> He grins defiance at the gaping crowd ;
> And spent at last and speechless, as he lies,
> With looks still threatening, mocks their rage and dies."
>
> —*Granville (Lord Lansdowne).*

At different places in New Zealand the remains of cannibal feasts may still be found. When collecting Moa bones from the sites of old Maori camps on the coast to the north of Bream Head I saw many remains of *kapura*, or ovens, about which were scattered human bones, together with those of the Moa and of seals and fish, and shells of molluscs. The large bones, such as the *femur* and the *humerus*, were generally split open, so as to extract the marrow. Remains of human skulls which I saw amongst the sand were beautifully bleached, and the bones of the skulls disarticulated through the action of the weather. At this place I picked up numerous flakes of obsidian, which were used as knives for cutting up flesh. The obsidian was much valued, and was brought from the Bay of Islands district. At one spot I noticed a block of it, which would weigh some 30 lbs. or 40 lbs., which had been used for chipping flakes from.

At the present time cannibalism is quite common in New Guinea and many of the less frequented islands of the South Seas, notably New Hebrides, New Ireland, Solomon and such like groups. In New Zealand, owing to earlier European, and especially missionary, intercourse, the practice ceased much sooner than in Fiji. It is to the beneficial influence of missionary enterprise that the greatest amount of credit for the present happy condition of the splendid Fijian race must be credited. It speaks volumes for the tact and devotion of the pioneers of missionary work who first entered Fiji that, in spite of all the unbridled ferocity of the natives, and the boldness with which the missionaries mingled with them, only one white missionary was eaten in Fiji. This was a Mr. Williams, who, against the strongly expressed advice of the friendly natives amongst whom he was stationed, persisted in going to the Upper Rewa River, where the *Kai colo*, or Mountaineers, the most ferocious of all the Fijians, were in a very disturbed state. The result was that he and his party of natives were attacked, killed, and eaten, one man only escaping to tell the tale. With the spread of the *lotu*, or Christian

religion, the nature of the people has been changed; no longer is the wild cannibal feast a possibility, and the great *lali*, or drums, which formerly sounded the dread signal of death, now serve the purpose of church bells, their musical booming being heard in every village as the call to the regular religious exercises. One may now go anywhere in Fiji, and every evening at the regular hour the *lali* will be heard, and the people collect to hold their evening services. Schools and colleges in which the white missionaries, belonging to the Wesleyan denomination, are ably assisted by trained natives, are established at central spots for the training of native missionaries and teachers. Every village has its school, in which the little brown children are taught by native teachers who have been trained in the colleges. These children are able to read and write their own language quite as fluently and legibly as the children of European peoples of corresponding age are able to do theirs. The trained native missionaries read and write in every respect as well as do Europeans. This may be judged by an inspection of the letters exhibited, which were sent to me by a native student whom I used to employ to assist me in collecting. The one letter is written in Fijian and the other in English, and both are explanatory of his being unable to keep appointments which we had made.

Although fully as intelligent and receptive a race as the Fijians, the Maoris were by no means as amenable to missionary influence, nor as readily persuaded to abandon their barbarous customs. It was only by the use of great tact and caution that the early missionaries managed to gain any influence, and many and disheartening were the rebuffs with which they met in their labours. The Maoris always were suspicious of some ulterior purpose, and it required much patient application on the part of the missionaries to gain their confidence. The teaching of the doctrine of love, *aroha a te atua*, was something quite new to the Maori, and so much at variance with his own ideas and practices as to be quite unintelligible. The law of revenge was his law, and when the *pakeha* told him of a law of forgiveness he turned away with scorn and contempt. Those tribes who were induced to embrace the new doctrine were looked upon by their neighbours as having grievously degenerated, and were subjected to all manner of persecution. However, patience, enthusiasm, and perseverance conquered in the end, and gradually this noble race became amenable to the new order of things. Colleges and schools for the Maoris are now abundant, and the great bulk of the natives are very well educated. They have shown great shrewdness as business men, and Maori members sit in Parliament to represent the native interest.

It is very sad to think that both Fijian and Maori are slowly but surely decreasing in number. The advent of the white man

means sooner or later the disappearance of the aboriginal. The quaint flora and fauna of New Zealand seem unable to hold their own against the introduced plants and animals, and are gradually becoming pushed into narrower and narrower limits. The life of New Zealand is a life belonging to an earlier geological time than that of Europe, and it seems to possess a lower power of resistance than the more hardy denizens of older lands, and so it, as it were, slips timidly away before the strange intruders. The Maori himself is made of sterner stuff, but the law seems irresistible, and, like the gentle wingless *Kiwi* of his native land, he must gradually succumb to the pressure of the presence of the *pakeha*. The *Moa* is dead, the *Kiwi*, the *Tautara*, the *Kakapo*, and other unique forms of New Zealand life are fast disappearing, and after a time the Maori will have followed them into the great silence, while the teeming race of the *pakeha* intruder will have overrun his land.

The Surrey Hills (Victoria) Field Club.—This club, which has been established by a few enthusiasts for directing the attention of the young people of one of our suburbs to natural history, held an encampment at Eastertide, at Point Cook, Port Phillip Bay, when ten members went under canvas and employed about a week in collecting excursions, &c., in the neighbourhood. Their records include twenty-six species of birds and six of fish, with numerous other marine objects. Botany is poorly represented, but the locality is known to be deficient in plant life. The club holds monthly meetings for the reading of papers, lecturettes, and exhibitions of specimens, when, judging from a recent experience, enthusiastic audiences assemble and queer objects are brought for identification. We trust this example will be followed in other districts, and so help to foster a love of nature among the young.

The Field Naturalists' Society of New South Wales.—The third annual exhibition of this society was held on the evenings of 5th, 6th, and 7th April, when, judging from the list of exhibits to hand, there must have been a goodly show of Nature's workmanship, the list containing the names of sixty exhibitors. During the evenings exhibitions of microscopic objects with the aid of the oxyhydrogen microscope took place, and illustrated lecturettes, entitled "By the Sea," "In the National Park," and "Natural Curiosities," were delivered.

Mr. C. French, F.L.S., Entomologist to the Department of Agriculture, Victoria, has been elected an hon. member of the Field Naturalists' Society of New South Wales, and also of the Boys' Field Club, Adelaide.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part II.

Group—BOMBYCINA.

Family—HEPIALIDÆ.

PERISSECTIS. Meyr.

29. P. AUSTRALASIÆ, Don. (Hepialus australasiæ, Don., Ins. N. Holl.; Walk, Bomb., 1,558; Elhamma inconclusa, Walk., Bomb., 1,562; Pielus invarius, Walk., supp. 599).
Melbourne.

PORINA. Walk.

30. P. FUSCOMACULATA, Walk. (Oxycanus fuscomaculatus, Walk., Bomb., 1,574; O. pardalinus, Walk, supp. 598).
Melbourne, Healesville.

31. P. AUSTRALIS, Walk. (Oxycanus australis, Walk., Bomb., 1,574; Pielus maculosus, Feld., pl. lxxxi., i.; Porina Kershawi, Lucas, Proc. Linn. Soc. N.S.W., vi., 282, 1891).
Melbourne, Eltham, Kewell.

*32. P. NIPHADIAS, Meyr. (Proc. Linn. Soc. N.S.W., vol. iv., 1889, p. 1,122).
Melbourne.

ONCOPTERA. Walk.

33. O. INTRICATA, Walk. (Oncopera intricata, Walk., Bomb., 1,559).
Gisborne, Warragul, Melbourne, &c.

HECTOMANES. Meyr.

34. H. SIMULANS, Walk. (Fraus simulans, Walk., Bomb., 1,564; F. bilineata, *ib.*, supp., 595).
Gisborne, Melbourne.

35. H. POLYSPILA, Meyr. (Proc. Linn. Soc. N.S.W., iv., 1,127, 1889).
Wimmera.

36. H. FUSCA, Lucas (Proc. Linn. Soc. N.S W., vi., 283, 1891).
Moe, Gippsland.

HEPIALUS. F.

37. H. LIGNIVORUS, Lew. (Ins. N.S.W., pl. 16; Charagia lignivorus, Scott, Aust. Lep., 5, pl. ii.; Tr. Ent. Soc. N.S.W., ii., 29).
Melbourne, Fernshaw, Colac.

*38. H. EXIMIUS, Scott (Tr. Ent. Soc. N.S.W., ii., 35).

39. H. HILARIS, Lucas (Proc. Linn. Soc. N.S.W., vi., 284, 1891).
Gippsland.

LETO. Hb. (Zelotypia, Scott).

PIELUS. Walker.

40. P. INGENS, Walk. (Charagia ingens, Walk., supp., 596; Pielus erythrinus, *ib.*, 599).
Fernshaw.

41. P. HYALINATUS, H. S. (Hepialus hyalinatus, H. S., Lep. Ex., i., 50; Pielus hyalinatus, Walk., Bomb., 1,576; P. tasmaniæ, *ib.*, 1,577; Rhizopsyche Swainsoni, Scott, Aust. Lep., 11, pl. iv.; Pielus imperialis, Oll., Proc. Linn. Soc. N.S.W., 1,015, pl. xxxix., 1887).
Melbourne, Warragul, Fernshaw.

TRICTENA. Meyr.

*42. T. LABYRINTHICA, Don. (Cossus labyrinthicus, Don., Ins. N. Holl.; C. argenteus, *ib.*, H. S., Lep. Ex., i., 47–48; Pielus labyrinthicus, Walk., Bomb., 1,578; P. atripalpis, *ib.*, 1,577; P. hydrographus, Feld., pl. lxxx., 3).
Melbourne, &c.

FAMILY—COSSIDÆ.

COSSUS. Fabricius.

*43. C. RHYTIPHORUS, Lower (Tr. Roy. Soc. S.A., 1893).
Lilydale.

CULAMA. Walk.

COSSODES. White.

FAMILY—ZEUZERIDÆ.

ZEUZERA. Latr.

44. Z. EUCALYPTI, Bdv. (Eudoxyla eucalypti, Bdv., H. S., Lep. Ex., sp. ser., i., f. 164; M'Coy, Zool. Vic., pl. 30, dec. iii.)

45. Z. MACLEAYI, Scott.

46. Z. CASUARINÆ (?), Scott.

47. Z. ANGASII, Feld. (Xyleutes Angasii, Feld.)

FAMILY—PSYCHIDÆ.

PSEUDOPASA. Walk.

METURA. Walk.

48. M. ELONGATA, Saund. (Oiketicus elongata, Tr. Ent. Soc. Lond., v., 43; Metura Saundersii, Westw., p. 3, s. 223, pl. 35).

ENTOMETA. Walk.

49. E. IGNOBILIS, Walk. (Char., Undes. Lep., Het., p. 67; M'Coy, Zool. Vic., pl. 40, dec. iv.)
Gisborne, Melbourne, &c.

PANISA. Walk.

CLANIA. Walk.

50. C. LEWINII, Westw. (Clania (Oiketicus) Lewinii, Westw., Tr. Zool. Soc., 231, pl. 37, fig. i., 1854; C. tenuis, Rosen.) Melbourne.

THYRIDOPTERYX. Walk.

51. T. HERRICHII, Westw. (Proc. Zool. Soc., 228, pl. 36, f. i., 1854).
Melbourne, &c.

FAMILY—LIMACODIDÆ.

LIMACODES. Latr.

52. L. LONGERANS, White (Bombyx (Doratifera ?) Oxlei, Newm., *Zoologist*, ccxi.; Pelora Oxlei, Walk., B.M. Cat., Bomb.) Melbourne, Gisborne, &c.

MOMOPLA. Meyr.

DORATIFERA. Westw.

53. D. VULNERANS, Lew. (Bombyx vulnerans, Lew., Prod. Ent., pl. iv., fig. 5).
Melbourne, Daylesford, Gisborne, &c.

54. D. LEWINÆ, Lew. (Bombyx lewinæ, Lew., *loc. cit.*, pl. vi., p. 7).
Melbourne.

LETHOCEPHALA. Feld.

FAMILY—ARCTIADÆ.

EXOTROCHA. Meyr.

CALAMIDIA. Butl.

55. C. HIRTA, Walk. (Bomb., 510 (Lithosia); C. salpinctis, Meyr., Proc. Linn. Soc. N.S.W., p. 694, 1886).

On the authority of Dr. T. P. Lucas I place the above together.

SCOLIACMA. Meyr.

56. S. BICOLOR, Bdv. (Lithosia bicolora, Bdv., Voy. *Astrolabe*, v., 211, pl. iii., 9; L. rubratra, Tepper, Tr. Roy. Soc., S.A., v., 30).
Gisborne, Melbourne, Gunbower, Moe, and Gippsland.

57. S. ORTHOTOMA, Meyr. (Proc. Linn. Soc., N.S.W., 696, 1886).
Melbourne, Frankston.

58. S. PACTOLIAS, Meyr., *loc. cit.*, 696, 1886).
Melbourne.

TIGRIOIDES. Butl.

59. T. ALTERNA, Walk. (Setina alterna, Walk., Bomb., 520; Lithosia transversa, *ib.*, supp. 229).

*60. T. FURCIFERA, Walk. (Setina furcifera, Walk., Bomb., 520; S. trifurcata, *ib.*, supp, 237).
Melbourne, Gisborne, Healesville.

61. T. SPILARCHA, Meyr. (Proc. Linn. Soc. N.S.W., 699, 1886).
Melbourne, Kewell, Berwick.

62. T. NANA, Walk. (Lithosia nana, Walk., Bomb., 507).

PALÆXERA. Meyr.

TEULISNA. Feld.

BRUNIA. Moore.

LITHOSIA. F.

*63. L. BICOSTA, Walk. (Lithosia bicosta, Walk., Bomb., 506; Lithosia fraterna, Butl., Tr. Ent. Soc. Lond., 349, 1887).
Melbourne, Gisborne.

SYMMETRODES. Meyr.

HETERALLACTIS. Meyr.

CALLIGENIA. Dup.

HECTOBROCHA. Meyr.

NEOBROCHA. Meyr.

PARELICTIS. Meyr.

64. P. SALEUTA, Meyr. (Proc. Linn. Soc. N.S.W., 709, 1886).
Melbourne.

TERMESSA. Walk.

65. T. NIVOSA, Walk. (Lerna nivosa, Walk., supp., 805).
Melbourne, Gisborne, Ringwood.

66. T. SHEPHERDI, Newm. (Tr. Ent. Soc. Lond., iii., N.S., 285.
Healesville, Melbourne.

*67. T. LYELLIANA, Lower (Tr. Roy. Soc. S.A., 1893).
Gisborne.

68. T. LÆTA, Walk. (Bomb., 1,689).
Melbourne.

69. T. GRATIOSA, Walk. (Eutane gratiosa, Bomb., supp., 239).
Melbourne, Berwick.

70. T. ZONOPHANES, Meyr. (Proc. Linn. Soc. N.S.W., 921).
Wimmera.

71. T. DISCREPANS, Walk. (Supp., 265; Termessa hamula, Feld., Reis. Nov., pl. cvi., 5).
Fernshaw.

NOTE.—No. 27 in part i. was inserted in error. It should read thus :—

27. C. TRIANGULARIS, Don. (Ins. N. Holl., t. 33, f. 2, 1805).

(To be continued.)

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Transactions of Royal Society of South Australia*," vol. xvi., part 1 :—

This volume is reserved for the scientific results of the Elder Exploring Expedition, and the first part contains reports on "The Vegetable Exudations," by J. H. Maiden, F.L.S.; "Lepidoptera," by O. B. Lower; "Coleoptera," by Rev. T. Blackburn, M.A., and "Land and Freshwater Mollusca," by T. Bednall.

In "*Transactions of the Geological Society of Australasia*," vol. i., part 6 :—

"Notes on the late Land Slip in the Dandenong Ranges, Victoria, July, 1891," by F. D. Power, F.G.S.

In "*Proceedings of Royal Society of Victoria*," vol. iv., new series, part 2 :—

"On an Australian Land Nemertine (*Geonomertes australiensis*, n. sp.)," by A. Dendy, D.Sc., F.L.S. Fully describes and figures the land nemertine found at Walhalla, and recorded in *Victorian Naturalist*, December, 1889; also found by excursion party of Field Naturalists' Club to Ferntree Gully on 14th March, 1891.

"Preliminary Description of Victorian Earthworms," part 1, by Prof. W. Baldwin Spencer, M.A. In this are described and figured 11 species (all new) of the genus Cryptodrilus, and 10 species (all new) of the genus Megascoloides, many of the specimens having been taken during excursions of the Field Naturalists' Club.

"Catalogue of Algæ collected at or near Port Phillip Heads and Western Port," by J. Bracebridge Wilson, M.A., F.L.S. The author enumerates 491 species belonging to 170 genera, 32 orders, and 3 classes of marine Algæ, giving full reference notes to the description of each species. Of these 6 genera and 60 species were previously unknown.

NOTES.

The Butterfly Danaus Erippus, Cram.—An important misprint with reference to this butterfly occurs in the April number of the *Victorian Naturalist* (vol. ix., page 178, line 15), where the date given, 1890, should be 1870.

Regarding the powers of flight of this insect, a correspondent writes:—"When 400 miles off the coast of South America (captain's reckoning) a large butterfly, which proved to be *Danaus erippus*, flew on board."—Extract from diary.—C.C.B.

A Rare Moss.—At the March meeting of the Field Naturalists' Club Mr. R. A. Bastow exhibited, through the kindness of Baron von Mueller, a specimen of the rare moss *Pleurophascum grandiglobum* (Lindberg), collected by Rev. J. Bufton at Picton River, Tasmania. The plant is remarkable in being truly pleurocarpous, and yet a robust phascacious (acrocarpous) plant. The magnificent golden lidless capsules are interesting to muscologists, as they crown a long fruit-stalk proceeding from the side of a comparatively large plant—for the Phascums are known as being among the very smallest of moss-plants. Although the capsule is large, pale yellow, smooth, and glossy, the sporangium is comparatively small and the space between the walls is traversed by anastomosing cell-threads. The spores are elliptic and distinctly curved.

Australian Fungi.—Mr. D. M'Alpine, F.C.S., Pathologist to the Victorian Department of Agriculture, is preparing for publication by the Department a "Systematic Census of Australian Fungi," together with a host-index and list of works on the subject. He is desirous of making the list as complete as possible, and will be pleased to receive from workers any published papers, etc., especially on the microscopic forms. It is proposed to continue the list in annual supplements.

Australian Lepidoptera.—Mr. Jas. Lidgett, Myrniong, is preparing for publication a "Bibliographical Catalogue of the Described Transformations of Australian Lepidoptera," and will be pleased if any entomologists having unpublished notes of life-histories of lepidoptera will put them into print as early as possible, so that they may be recorded in the catalogue.

The Boys' Field Club, Adelaide.—The annual Easter encampment of this society was held this year at Balhannah, a township on the intercolonial railway, about thirty miles east of Adelaide. The boys, numbering 63, together with 16 adult friends, and 2 cooks, were under the charge of Mr. W. C. Grasby and others, owing to wet weather did not go into camp till Good Friday morning, breaking up again on the following Friday. The fourteen tents were pitched in an oval shape, enclosing a space for a huge camp fire, round which portions of the evenings were spent. During the days numerous excursions were made to various points of interest in the district, halts being called and short addresses given to the boys by the seniors present. The evenings were passed with singing and recitations, interspersed with short chats on insects, plants, &c. Altogether, from reports received, the outing seems to have been a decided success, and the boys are to be congratulated in having such a president and leader as Mr. W. C. Grasby, who has made the Adelaide Boys' Field Club his special care and delight.

Field Naturalists' Club of Victoria.

President:

PROFESSOR W. BALDWIN SPENCER, M.A.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

No Entrance Fee. Annual Subscription, including copy of proceedings, 15s., dating from 1st May.

The Ordinary Meetings for the reading of papers, and exhibition of specimens, with a short conversazione, are held on the second Monday in each month at the Royal Society's Hall, Victoria Street, Melbourne, at 8 p.m.

A Meeting for practical work is also held on the fourth Monday in each month, at the Royal Society's Hall, at 8 p.m.

The proceedings of the Club are recorded in its journal—"The Victorian Naturalist." Annual Subscription, 7s., post free. (To members free.)

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor, Mr. F. G. A. Barnard, Kew.

Most of the numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Rev. W. Fielder, St. Kilda, at sixpence each; or in sets. Vol. I. (1884-85), 16 numbers, 7s. 6d.; Vol. II. (1885-86), 12 numbers, 6s.; Vol. III. (1886-87), 12 numbers, 6s.; Vol. IV. (1887-88) out of print; Vol. V. (1888-89), 12 numbers, 6s.; Vol. VI. (1889-90), 12 numbers, 6s.; Vol. VII. (1890-91), 12 numbers, 6s.; Vol. VIII., 12 numbers, 6s.; Vol. IX., 12 numbers, 6s.; each set with title-page and index for binding.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

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PUBLISHED JULY 5, 1893.

Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions he records.

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THE

Victorian Naturalist.

Vol. X.—No. 3. JULY, 1893. No. 115.

FIELD NATURALISTS' CLUB OF VICTORIA.

The thirteenth annual meeting of the Club was held in the Royal Society's Hall on Monday, 12th June, 1893. Mr. C. Frost, F.L.S. (one of the vice-presidents) occupied the chair, and more than 100 members and friends were present.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library:—"Report on Victorian Coalfields," by J. Stirling, F.G.S., from the Department of Mines, Victoria; "Handbook of the Flora of New South Wales," by C. Moore, F.L.S., from the New South Wales Government; "A Companion for the Queensland Student of Plant Life," by F. M. Bailey, F.L.S., from Department of Agriculture, Brisbane; "Proceedings of the Royal Society of Victoria," new series, vol. v., 1893, from the Society; "Proceedings of the Geographical Society of Australasia, Victorian Branch," vol. x., 1892, from the Society; "Proceedings Field Naturalists' Section of the Royal Society of South Australia," 1891–2, from the Society; "First Annual Report of the Natural History Society of Queensland, Brisbane," from the Society; "Twenty-ninth Annual Report of the Zoological and Acclimatization Society of Victoria," 1892, from the Society; "Nature Notes: the Journal of the Selborne Society, London," January, February, March, and April, 1893, from the Society; "The Mediterranean Naturalist," ii., 22, March, 1893, from the publisher, and "Journal of Pharmacy," May, 1893, from Society.

REPORTS OF EXCURSIONS.

Reports of excursions to the Entomological Department and the eastern shore of Port Phillip were read by Mr. F. G. A. Barnard (see page 45) and Mr. J. Gabriel (see page 47).

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that a meeting for practical work was held on Monday evening, 22nd May, when Mr. D. M'Alpine, F.C.S., dealt with the subject of "Rusts and Smuts." It was pointed out that the subject was a very large and extensive one, but for convenience of treatment attention was confined to the

rusts and smuts of wheat actually found in the colony. The typical rust of wheat was *Puccinia graminis*, Pers., and in the course of a rapid sketch of its life-history it was shown how the Red Rust was at first called *Uredo linearis*, and the so-called Black Rust *Puccinia graminis*, the fact not being then known that the self-same fungus produced the red spores, or uredo spores, or summer spores, for rapid multiplication, and the black (chestnut-brown) spores, or teleuto spores, or winter spores, for reproduction in the ensuing spring. The Æcidium of the Barberry was likewise shown—not a native specimen, however, as it has never been found in Australia—and its connection with the rust in wheat discussed. The group Uredineæ, to which the rusts belong, was next noticed. Thereafter specimens of the "red" and "black" rust were passed round, and the spores of each examined under the microscope as to their shape, size, colour, surface, transparency, and contents. The effects of some reagents were likewise noted, such as caustic potash dissolving out the contents. The smuts next came in for their share of attention, and the loose mode of naming them prevalent among farmers was deprecated. The typical smut of wheat, &c., *Ustilago tritici*, from which the group name of Ustilagineæ was obtained, was first considered. Next the Stinking Smut or Bunt of wheat, having the smell of stinking fish—*Tilletia tritici*; and lastly the so-called Flag Smut—*Urocystis occulta*. Abundant specimens of each were handed round, and the spores again critically examined under the microscope, for in dealing with fungi it is a truth to be remembered, "By their spores ye shall know them." The small and smooth spores of the Loose Smut, or *Ustilago tritici*, were contrasted with the larger and reticulated spores of the Bunt, or *Tilletia tritici*, while the spores of the Flag Smut, or *Urocystis occulta*, were most peculiar. Each spore consists of one to three cells, surrounded by several smaller sterile cells, like so many little bladders, giving lightness to the structure and exposing a relatively larger surface to the action of the wind for purposes of dissemination. Several questions were asked and answered, and measures of prevention for Bunt, such as steeping the seed before sowing in hot water at a temperature of about 131° F., were referred to. Various specimens of other rusts and smuts were shown, and the keen interest evinced in the specimens, as they were mounted and examined by the owners of the microscopes, showed that a pleasant and profitable evening had been spent.

ELECTION OF MEMBERS.

On a ballot being taken, Miss L. J. Little, B.Sc., Dr. Cherry, B.S., and Messrs. J. Cox, L. Gries, and G. Hartkopf were duly elected members of the Club.

ANNUAL REPORT.

The hon. secretary (Rev. W. Fielder) then read the thirteenth annual report, 1892–3, which was as follows :—

"To the Members of the Field Naturalists' Club of Victoria. Ladies and Gentlemen,—Your committee have much pleasure in presenting to you the thirteenth annual report of the Club's doings, being for the period ending 30th April, 1893.

"The membership of the Club continues to show an increase, 43 members, of whom 4 were ladies, and 3 junior members having been elected. As usual, of these newly elected ones some 13 have not as yet qualified themselves for membership by payment of the necessary subscription, so that really only 30 additional names have to be permanently added to our list. Naturally, the continued commercial depression has materially affected some of our members, as evidenced by several resignations, but we begin a new year with no less than 228 members on the roll, of whom 213 are on the subscription list, the rest being either life or hon. members.

"One prominent hon. member has passed away, to the regret of those who valued him for his contributions to our botanical knowledge. We allude to the late Rev. Dr. Woolls, F.L.S., of Sydney. Since his election in 1884 he showed his interest in the Club by contributing no less than six papers to our journal, most of them dealing with the economic phase of botany. Death has also robbed our ranks of another hon. member in the person of Mr. R. D. Fitzgerald, F.L.S., also of Sydney, well known for his work on the Australian orchids; whilst this section of our list has been strengthened by the addition of Mr. T. A. Forbes-Leith, one of the original members and office-bearers of the Club, but now resident in England, and Mr. A. H. S. Lucas, M.A., B.Sc.

"The number of papers read has been fully sustained, the supply being equal to the demand. An analysis of this list shows that zoology claimed 9, botany 1, geology 3, general subjects 3, trips 2, and excursions 13. The thanks of the Club are due to those who have in this way not only proved themselves practical naturalists, but have been at pains to put their observations and experience at the disposal of their fellow-members.

"We only wish that the list of new contributors had been longer, feeling assured that there are many members who would prove frequent contributors if only the initiatory step in the shape of a first contribution could be accomplished.

"The *Victorian Naturalist* has continued its course successfully, and has just entered upon its tenth year of issue. Judging from a steady demand for complete sets, it seems to be gaining a place on the shelves of many public and private libraries. In this connection we may note that, owing to his election to the headmastership of Newington College, Sydney, Mr. Lucas, M.A., B.Sc.,

regretfully tendered his resignation in January last as editor of the *Naturalist*, a post he had held since its inception nearly nine years ago. A unaminous vote of thanks was accorded him for his valuable services, and at a subsequent meeting he was enthusiastically elected an hon. member of the Club.

"Fortunately, at this juncture the committee were able to secure the services of Mr. F. G. A. Barnard, whose unselfish work both as secretary (for 6 years) and librarian (3 years) specially fit him for the position. His appointment as editor will doubtless ensure a continuance of that successful issue which has characterized the publication in the past.

"The Library continues to increase, chiefly owing to donations from the Governments and scientific societies, &c., some 90 books, reports, or parts of proceedings having been added during the year. The number of books exchanged at each monthly meeting is increasing, but some inconvenience is caused to members by borrowers so much exceeding the time allowed for the loan of books.

"The ordinary meetings have been held regularly during the past year, and the increased attendance shows that they are appreciated by many of the members, the average attendance reaching as high as 75, as compared with 70 of last year.

"In addition to this ordinary monthly meeting an additional one has been held during the past few months for practical work. It was hoped when this special monthly meeting was first instituted, that it would be taken advantage of by those who favour different branches of natural history work; but as yet the meetings have been given up principally to microscopic work. Amongst the subjects taken up may be mentioned—rotifers, mosses, polyzoa, sponges (two meetings), micro-fungi, protozoa, photo-micrography, and rusts and smuts. Fair attendance at every meeting shows that a want is being supplied, and it is hoped that the new executive will see its way to give the experiment a further trial. Systematic and regular attendance at these meetings must be productive of good to those who can avail themselves of this opportunity of obtaining practical advice from those whose special leanings and opportunities have enabled them to follow particular lines.

"As intimated in the report last year the prize competition for natural history specimens by young collectors has been continued, and although the number of exhibits does not quite reach those of last year there is an evident advance in the quality of the exhibits, notably in the botanical section, which includes six exhibits out of a total of fifteen. Last year this section was undoubtedly the weakest, and the present strength of it is, therefore, very encouraging, and without doubt forms a strong argument in favour of a continuance of the scheme—since once it is generally known and

looked for year by year fresh competitors will assuredly come forward. Exhibits such as we desire necessarily take time to collect, and the success or non-success of the scheme cannot well be judged till it has been in operation for some years. We again call attention to the fact that a prize fund in connection with these annual competitions has been started, in order that the general funds of the club may not be encroached upon, and in soliciting subscriptions express regret that the appeal has not met with that substantial support which it deserves, only one or two members outside of the executive having up to the present supported it. We take this opportunity of thanking those who have shown their sympathy in a practical manner. Baron von Mueller, with his usual kindness, has again consented to distribute the prizes to the successful competitors this evening.

"In a recent circular the committee intimated that the yearly conversazione would be held about the end of May. Since that notice appeared we, in company with a good many others, have suffered considerable inconvenience by the locking up of the funds of the Club in the London Chartered Bank. This, together with the continued retention of the fixed deposit and current account (as notified in last year's report) by the Metropolitan Bank, finally decided the committee in further postponing the conversazione.

"It has been decided to hold the next extended excursion of the Club on the Furneaux Group, the eastern islands of Bass Straits, in November next. The sub-committee appointed to arrange the necessary details hope to issue a full report in the course of the next few weeks.

"As usual, the Club has kept watch on the interests of our feathered friends, and two deputations have, during the past year, waited upon the Commissioner of Customs, to advocate the imposition of a gun tax, and to protest against any alteration in the date for the close season for quail. As regards the former effort, a change of Government, naturally, somewhat obscured the results, but public opinion favoured the efforts of the Club, and no doubt, indirectly, our insectivorous birds will benefit by the publicity given to the reckless and indiscriminate shooting which is too prevalent amongst us. Those who guarded the interests of the quail are glad to state that the old rule as regards the close season still remains in force.

"Exhibits of wild flowers were held at the October and November meetings. On the first occasion the show was a very good one, but the November one did not reach in degree of excellence that of the previous year—we venture to think not so much from the scarcity of flowers at that season as from the fact that many members entirely overlooked the notice soliciting exhibits which appeared in the monthly circular for that date.

"The financial position of the Club is not so satisfactory as your committee would desire. The receipts for the year amounted to £120 1s. 4d., and the expenditure to £150 2s. 6d., thus reducing the credit balance of the Club from £99 12s. 4d. to £69 11s. 2d. There is also a sum of £2 1s. 6d. to the credit of the Prize Competition Fund. The amount 'locked up' in the Metropolitan Bank has been reduced by the receipt of a dividend of £5 4s. 9d. to £63 13s. 10d.; while the sum of £7 3s. 10d. is 'locked up' in the London Chartered Bank. Liabilities exist amounting to £52, but they are more than covered by the unavailable balances and arrears of subscriptions, early payment of which latter your committee would urge, so that the work of the incoming committee may not be impeded by want of funds.

"In conclusion, your committee would urge on all members the benefits both of attending the monthly meetings and excursions, and also helping with either papers or notes for the information of their co-workers.

"Signed, on behalf of the Committee,

"CHAS. FROST, *Chairman.*
"WALTER FIELDER, *Hon. Sec.*

"*12th June*, 1893."

The report was adopted, on the motion of Messrs. Luehmann and Gregory.

FINANCIAL STATEMENT.

The hon. treasurer (Mr. F. Wisewould) then read the financial statement for 1892–3, which was as follows:—

RECEIPTS.

To Balance on 30th April, 1892	£99	12	4
,, Subscriptions	101	10	0
,, *Victorian Naturalist*	18	11	4
	£219	13	8

EXPENDITURE.

By Printing *Victorian Naturalist*	£90	0	0
,, Rent of Rooms, &c.	22	5	0
,, Books and Periodicals	10	8	0
,, Printing and Stationery	7	13	0
,, Postages and Sundries	17	14	6
,, Subscription—"Macleay Memorial Volume" ...	1	1	0
,, Donation in last Balance-sheet transferred to Prize Fund	1	1	0
,, Balance	69	11	2
	£219	13	8

PRIZE COMPETITION FUND.

RECEIPTS.

Donation, as per last Balance-sheet	£1 1 0
Donations	5 17 4
	£6 18 4

EXPENDITURE.

Prizes	£4 16 10
Balance	2 1 6
	£6 18 4

F. WISEWOULD, *Hon. Treasurer.*

1*st May*, 1893. Audited and found correct.

(Signed) R. A. BASTOW, } *Auditors.*
MELBOURNE, 8*th June*, 1893. H. P. C. ASHWORTH, }

The statement was received and adopted, on the motion of Messrs. French and Hogg.

OFFICE-BEARERS FOR 1893-4.

The following office-bearers for 1893-4 were declared duly elected, being the only nominations received :—President, Mr. H. T. Tisdall, F.L.S. ; vice-presidents, Mr. F. G. A. Barnard and Dr. A. Dendy, F.L.S. ; hon. treasurer, Mr. F. Wisewould ; hon. librarian, Mr. E. Anderson ; and hon. secretary, Rev. W. Fielder.

A ballot for five members of committee resulted in Messrs. D. Best, C. French, F.L.S., G. R. Hill, H. R. Hogg, and J. Shephard being elected.

A unanimous vote of thanks was accorded to the retiring office-bearers.

The Chairman referred to the loss the Club, and particularly Victorian natural science, would sustain in the projected departure from the colony of Dr. A. Dendy, F.L.S., who had received the appointment of Lecturer in Biology at Canterbury College, in the University of New Zealand, and would enter upon his duties at Christchurch in February next ; and while congratulating Dr. Dendy on his promotion, hoped that he would sometimes forward to the Club notes of his New Zealand observations for comparison and discussion.

PRIZE COMPETITION FOR NATURAL HISTORY SPECIMENS.

Baron von Mueller, K.C.M.G., one of the patrons of the Club, with his usual kindness, then proceeded to distribute the prizes in connection with the above competition, and in his introductory remarks spoke of the reverence which the study of nature tended to foster in the student, as well as of the educative value of the study of natural science. The value and attractiveness of each prize was enhanced by the kindly remarks which Baron von Mueller addressed to each recipient. The following is a list of the prize-takers, arranged in order of merit, as adjudged by Dr. A. Dendy, F.L.S., and Messrs. C. French, F.L.S., C. Frost, F.L.S., and H. T. Tisdall, F.L.S.

GROUPS—*Zoology*, *Botany*, and *Geology*.

Class 2—MOLLUSCA—Charles J. Gabriel; Daisy Lilley.
,, 3—LEPIDOPTERA—Margaret R. Cane.
,, 4—COLEOPTERA—Jack Turnbull.
,, 5—HYMENOPTERA—Bernard F. Hill; Gerald F. Hill.
,, 7—LIFE-HISTORY OF INSECTS—G. F. Hill; B. F. Hill.
,, 8—FLOWERING PLANTS—Rose Elliott; Frederic Higgins; Florrie E. Hobart.
,, 11—GENERAL COLLECTION (Botanical)—Grace E. Hazard.
,, 12—ROCKS AND MINERALS—Stanley Mitchell.

Two additional special prizes were presented by Baron von Mueller to Florrie E. Hobart and Grace E. Hazard for their very creditable botanical exhibits.

A vote of thanks, proposed by Mr. J. B. Gregory, was enthusiastically accorded Baron von Mueller for his kindness in distributing the prizes on this occasion.

EXHIBITION OF SPECIMENS.

The exhibits in connection with the prize competition for young collectors were on view, and elicited much favourable comment from the visitors present, the display, as a whole, being a decided advance on that of the first competition.

The following were the principal exhibits by members :—By Mr. E. Anderson.—Drawings of life-histories of the following butterflies and moths :—*Delias aganippe*, *Heteronympha merope*, *Ialmenus evagoras*, *Ogyris orœtes*, *O. abrota*, *O. olane*, *Hypochrysops delicia*, *Sphinx convolvuli*, *Chœrocampa scrofa*, *Danima banksii*, *Teara melanosticta*, *Monoctenia falernaria*, *M. vinaria*, *Selidosema lyciaria*, *Stathmorrhopa beggaria*, *Thailina punctilinea*, *T. inscripta*, *Scœptera marginalis*, *Manustra trilineata*. By Miss Cochrane.—Paintings of Victorian orchids and other wild flowers. By Mr. C. French, F.L.S. (for Entomological Branch of Department of Agriculture, Victoria).—Specimens showing Life-history of Victorian "Bot," or Horse-fly (fam., Œstridæ)—(*a*) egg on hair of horse; (*b*) larvæ taken from stomach of horse; and (*c*) perfect insects, reared from pupæ. By Mr. C. French, jun.—Victoria—Eggs of Chestnut-backed Ground Thrush, Spotted Ground Thrush, Hill Crow Shrike, Azure Kingfisher; Tasmania—Eggs of Selby's Shrike Thrush, Hazel-eyed Crow, Strong-billed Honey-eater; Queensland—Spangled Dronga Shrike. By Mr. Jos. Gabriel.—Eggs of Australian Pelican and Musk Duck. By Mr. T. S. Hart, M.A.—Specimens of rocks and minerals. By Mr. H. F. Hill.—Specimens of eight species of Victorian House-building Moths (fam., Psychidæ); also two "Vegetable" Caterpillars (*Cordyceps robertsii*), from New Zealand. By Mr. J. Lidgett.—Larvæ of moth (*Termessa shephardi*), bred from ova deposited in February, 1893. By Mr. F. Marsh.—Skins of following birds :—New Zealand, North Island—*Heteralocha acutirostris* (Huia), *Prosthemadera novæ*

zealandiæ (Tui, Parson Bird), *Carpophaga novæ zealandiæ* (New Zealand Pigeon), *Halcyon vagans* (New Zealand Kingfisher), *Chrysococcyx lucidus* (Shining Cuckoo); South Island—*Apteryx australis* (South Island Kiwi), *Stringops habroptilus* (Kakapo, Owl Parrot), *Nestor notabilis* (Kea Parrot), *Glaucopis cinerea* (Kokako, Orange-wattled Crow); New Guinea—*Dasyptilus pesquelli* (Fig-eating Parrot), *Ægotheles bennetti* (Goat Sucker), *Amblyornis subalaris* (Orange-crested Bower Bird), Astrolabe Mountains; *Tanysiptera microrhynchus* (Port Moresby Racket-tailed Kingfisher), *Eudynamis taitensis* (Long-tailed Cuckoo), *Craspedophora magnifica* (New Guinea Rifle Bird), *Ptiloris paradiseus* (Rifle Bird), *Seleucidis nigricans* (Twelve-wired Bird of Paradise), and King Bird of Paradise. By Mrs. Martin.—Giant Earthworm, from Weeba, Drouin; also, new book, "A Companion for the Queensland Student of Plant Life," by F. M. Bailey, F.L.S. By Baron Von Mueller, K.C.M.G.—*Acacia rossei* (new to science), from Western Australia, collected by Mr. W. Webb. By Miss A. E. Roberts.—Bat, from Kew; also, 30 birds' eggs from Gippsland and England.

After the usual conversazione the meeting terminated.

VISIT TO ENTOMOLOGICAL DEPARTMENT.

In place of the usual outdoor excursion for Saturday, 13th May, the committee, when arranging the programme of excursions for the year, decided to accept the invitation of one of our warmest supporters, Mr. C. French, to visit his den at the Exhibition Building—viz., the Entomological Branch of the Department of Agriculture; and, as the weather turned out, it was a most fortunate arrangement. At 2.30 p.m. twenty-four members had put in an appearance, and but for a very heavy storm just before, possibly the number would have been increased; however, the party was found to be just a nice size for convenient perambulation of the building.

It is now nearly two years since the Club paid its last visit to the Department, and many changes in arrangement were noticed, while the great increase in specimens, &c., showed that the officers had not been idle in the interval. The library is constantly being added to, and contains many books not to be found among the entomological works at the Public Library. Several of these were displayed for the benefit of the visitors, and excited general admiration. The Department also possesses a good collection of charts and diagrams of destructive insects, published by the Royal Agricultural Society of England and other institutions. Some little time was spent in viewing the increasing collection of life-histories of destructive Victorian insects; also their dissections, gall insects, &c. A beautiful

series of microscopic slides, showing every stage of that dreaded scourge of the vigneron, *Phylloxera vastatrix*, lent to Mr. French by Mr. J. Bosisto, C.M.G., were explained. It is pleasing to report that Part II. of the "Handbook to the Destructive Insects of Victoria," by C. French, is now in the hands of the Government Printer—the plates, 22 in number, being ready and on view on the occasion of our visit, while many of the drawings for Part III. are well forward. Mr. French expressed his regret that a large collection of type-specimens, duplicates of those in the South Kensington Museum, London, had not yet arrived, but would soon be available for students. As a collateral branch, the collection of Victorian Insectivorous Birds, with their nests and eggs, is steadily increasing, and is made much use of by farmers, fruit-growers, &c., who, it may be remarked, are taking much interest in this branch of the Department of Agriculture. Several of the newest kinds of spraying machines and other appliances offensive to insect life were on view, and their actions explained. It had been the intention of the Secretary for Agriculture (Mr. D. Martin) to be present, but he was called away to the country on Departmental business at the last moment.

In order to make the visit as complete as possible, at the suggestion of Mr. French the Exhibition Trustees invited the members to view the economic collections being formed in the permanent arrangements; and, under the guidance of Mr. G. R. Fincham, one of the trustees, we first of all paid a visit to the crocodiles, seals, and those comical specimens of bird life, the King Penguins. A glance at the contents of the Aquarium tanks, with a few words on the method of keeping their inhabitants in good health, brought us to the new Egyptian Court, with its mummies and mummy cases. Great astonishment was exhibited when viewing the quantity of mummy cloth removed from one of the bodies, and, as a memento of their visit, each of the members present was presented with a small piece of the ancient fabric. We were now conducted to the Cyclorama of Old Melbourne, and its features pointed out. As no guide to this has yet been published, it may be of interest to mention that the spectator of the panorama is supposed to be standing on the top of the unfinished walls of a church which previously occupied the site of the present Scots Church, at the corner of Collins and Russell streets, the greater part of the picture lying to the southward and westward of that standpoint. A brief inspection was then made of the economic collections of minerals, botanical productions, zoological specimens, &c., all being arranged for educational purposes, the number and excellence of the exhibits quite surprising the majority of the visitors.

The afternoon's inspection now came to a close, and the office-bearers of the club present were invited into the Trustees' room,

where light refreshments were partaken of, and Messrs. Fincham and French cordially thanked for the enjoyable and instructive afternoon spent in the buildings.—F. G. A. BARNARD.

MARINE DREDGING EXCURSION.

THE Queen's Birthday (24th May) was set apart for a marine dredging expedition off the eastern shore of Port Phillip Bay. Four members met at the appointed time at Williamstown, and having waited some little time for two others, who did put in an appearance, proceeded in the steam yacht *Firefly* towards Middle Brighton pier, where we were to meet the yacht *Starlight* with several other members. Nothing eventful occurred on the run across, and, picking up two more members at the Brighton pier, the party now numbered twelve, including two ladies.

On arriving at Half-Moon Bay we anchored while lunch was disposed of; but the rest was not long, as the members were anxious to get out the dredges. Dredging was carried on from each vessel, but, unfortunately, the wind freshening had raised an uncomfortable sea, rendering it very unpleasant for such work; however, our company stuck manfully to their work for about three hours. Starting about a mile off the Black Rock, we worked in depths varying from two to five fathoms with fair success, considering the roughness of the weather, and from this reason were unable to carry out our original intention of dredging as far as Rickards Point. We then steamed for Middle Brighton, taking the yacht in tow, and dredging on the way. Parting company with the Brighton contingent, we made for Williamstown, reaching there soon after 6 p.m., when ample justice was done to an excellent tea, thus ending a very enjoyable outing, made doubly so by the kindness of Messrs. E. F. Cooke and C. J. Cottell, the owners of the steamer and yacht respectively, who so kindly placed their vessels at the disposal of the Club.

The following is a brief list of the principal specimens secured:—Mollusca—20 species living, of which *Nucula grayii* was the most noteworthy, four specimens being obtained, Mr. Gatliff having found only odd valves previous to this occasion. *Murex triformis*, *Venus lamellata*, *Cytherea lamarcki*, and *Pecten laticostatus* were the most important of the other living species; 26 species of dead shells were obtained, among which *Chamostrea albida* was noted. Polyzoa were represented by *Mucronella ellerii*, *Microporella diadema*, *Chorizopora brogniartii*, and *Smittia lansborovii*. Among Foraminifera, fine specimens of *Lagena vulgaris* were obtained. Of Diatomaceæ, about 20 species were secured, belonging to the following genera:—Amphora, Auliscus, Actinoptychus, Biddulphia, Coscinodiscus, Campylodiscus, Emphillodium, Navicula, Pleurosigma, Synedra, Surirella, and Triceratium.—J. GABRIEL.

NOTES ON A NEW VICTORIAN INJURIOUS INSECT.

(With Description by G. B. Buckton, F.R.S., &c.)

By C. French, F.L.S., &c., Government Entomologist.

(Read before the Field Naturalists' Club of Victoria, 8th May, 1893.)

About twelve months since my attention was directed to some apples and other trees which were being rapidly destroyed, owing to some obscure insect having perforated both upper part of stem and branches. The locality from which I received the information was the Goulburn Valley, situated about fifteen miles from Numurkah. Upon receiving the information I at once started for the purpose of ascertaining, if possible, some particulars of the insect doing the mischief, also to recommend some preventive and remedial measures for treatment of same. On arrival at Numurkah I was met by Mr. Williams, President of the Shire, who kindly drove Mr. Knight (Government fruit expert) and myself out to see the orchard. I found the tree—a fairly large one—to have been perforated in all directions. Amongst the branches certain small insects were found and captured; but, as it afterwards turned out, these were not the real culprits. Having tendered some advice as to how to proceed to save the life of the tree, we returned late at night to Numurkah.

In the month of January a well-known orchardist of Balwyn, about seven miles east of Melbourne, called upon me with specimens of some of his trees which were very badly affected with what afterwards proved to be caused by the same insect as at Numurkah. Upon going to the orchard in question, Mr. Fankhauser showed me an insect which he suspected to have caused the destruction of so many of his fine trees, and upon examination I found this to be a homopterous insect, and with the aid of Mr. Buckton's fine work on the Tettigiidæ, just published, I was able to place it in, or very near, to the group to which Mr. Buckton has since determined it belongs. In this somewhat of a dilemma I resolved to accept the kind offer of assistance from this distinguished specialist, and sent the insects in spirit to England, with a few notes as to its habits, &c. By the last mail I have received from Mr. Buckton the description, which he has kindly sent for Australian publication. I have, therefore, made up my mind to use the description so kindly granted to me by the above-named gentleman, and have prepared these notes, together with Mr. Buckton's scientific description, for our Club, feeling assured that the more useful the matter contained in our journal the more appreciated it will be by the general public. This insect deposits its eggs, from 6 to 8 in number, in punctures which it has made for the purpose, the same, with other interesting matters in connection with this strange insect,

being shown on the beautiful plate drawn at my request by Mr. C. C. Brittlebank, of this Club, and which will be reproduced in part iii. of "The Destructive Insects of Victoria." The punctures are very close together, so that the tree is perfectly riddled with holes, the apertures after the eggs have been deposited being closed with a white flocculent matter.

Mr. Buckton also remarks that other kinds of Tettigiidæ (which I may remark are closely allied to the Cicadæ) are known to ruin sugar-canes in parts of India and other tropical countries. It would appear that this is no new pest, as many old orchardists have years ago noticed the punctures on the trees, but up till the present time the culprit had not been discovered. Unluckily it has been ascertained that the natural home of this insect is in the wood of young Eucalypti, so that its exact range cannot well be estimated. It is a truly pitiable sight to see a once fine orchard nearly ruined by such a comparatively insignificant insect, this being another example of an indigenous insect having abandoned its natural food for the more palatable fruits of our orchards. I have counselled severe pruning when the tree is dormant, the prunings to be immediately burned, and, having done this, a thorough painting of the stem and larger branches with lime, sulphur, and soft-soap mixed; the smaller branches to be sprayed with kerosene emulsion and resin compound put on the trees whilst hot. So far we have found no indication of this pest having attacked the roots, but as this group are, in certain stages, below the ground, it may happen that the roots will be attacked also.

Description.

Prosops pedisequus, Buckton, n. g.

This insect is clearly one of the Cixiidæ, but it does not answer to the generic description given by Fieber in his "Cicadines d'Europe." It has the mixed characters of Cixius proper and of Oliarus. It differs from the first in having five pronotal keels and a different elytral neuration, and from the second in having small setigerous bulbs on the principle veins, and a clouded staining of the membranes. From both genera it differs in the peculiar form of the tumid front with its transverse keel.

If we are to keep to Fieber's diagnosis of the above genera the erection of a new genus seems to be inevitable. Thus I propose for this insect, hitherto undescribed, the name *Prosops pedisequus*, and I describe the genus thus:—

Genus—Prosops.

Head distinctly narrower than the pronotum. Clypeus sharply divided by a longitudinal keel and one short transverse carina. Eyes large. Two conspicuous tubercular marks on the under side of the seats of the antennæ. Pronotum with fine carinæ. Elytron

with six short transverse veins, the principle nervures dotted with small setigerous bulbs. Stigmatic cell charged with dark pigment. Hind tibiæ twice spurred. End of the pygofer round, with a small papilla, and surmounted by two short styles. Elytra more or less clouded with brown at their tips.

Prosops pedisequus, n. sp.—General colour, velvety-black. Pronotum black, with fine yellow carinæ. Edges of the abdominal rings fine yellow. Wings hyaline, membrane edged with yellow. Stigma black. Apices brocaded where the nervures furcate. Eyes large and red. The under sides black, with all the somitæ and sternal edges bright yellow. Legs brownish. Frons and post sternum greenish, but the upper part of the frons is black, leaving a swollen yellow protuberance in the middle. The chequered appearance of this insect suggests the notion of a livery, and therefore the above specific name. Size of head and body, 0·18 inch to 0·25.

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Transactions of Linnean Society of New South Wales*," 2nd series, vol. vii., part 3 :—

"Gall-making Buprestids," by W. W. Froggatt.

"Notes on the Family Brachyscelidæ (Gall-making Coccids), with some Account of their Parasites," by W. W. Froggatt.

"Revision of the Australian Amarygmides," part 1, by Rev. T. Blackburn, M.A.

In "*Journal and Proceedings of the Royal Society of New South Wales*," vol. xxvi., 1892 :—

"On the Effect which Settlement in Australia has produced upon Indigenous Vegetation," by Alex. G. Hamilton. This is a most interesting paper, going fully into the question from all points. The appendix contains a list of 165 species of plants which have become naturalized in the different colonies, and indicating which. The essay is one of the series of prize essays written for the Royal Society of New South Wales, and was awarded the Society's bronze medal.

Exchange.—To Entomologists.—Mr. W. B. Waterfall, Thirlmere, Redland Green, Bristol, England, desires to exchange English Coleoptera for Australian, and will be pleased to open up correspondence with collectors.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part III.

CLUACA. Walk.

72. C. RUBRICOSTA, Walk. (supp., 269).
Fernshaw, Gunbower, Dandenong, Gisborne, Melbourne.

(*SAROTRICHA.* Gn. Meyr., rect. Sarrothripa).

ZIA. Walk.

73. Z. ALLOPIS, Meyr. (MSS.)
Melbourne, Kewell.

74. Z. CHARACTIS, Meyr. (MSS.)
Melbourne.

SOROCOSTIA. Ros.

75. S. BIGUTTALIS, Walk. (supp., 1,507; Sorocostia trigonota, Meyr., Proc. Linn. Soc. N.S.W., 719, 1886).
Melbourne.

*76. S. PAROMÆA, Meyr. (Proc. Linn. Soc. N.S.W., 721, 1886).

77. S. ALBALIS, Walk. (Hypena albalis, Walk., supp., 1,143; Eromene vetustella, Walk., supp., 1,763; Nola strictalis, Zeller, Zool. Ver. Bot., 459, 1872, pl. ii., 3; Sorocostia vetustella, Ros., Ann. Mag., N. H., 436, 1885).

78. S. AULACOTA, Meyr. (Proc. Linn. Soc. N.S.W., 722, 1886).
Warragul, Fernshaw.

79. S. CYCOTA, Meyr. (*loc. cit.*, 723, 1886).
Melbourne.

NOLA. Leach.

80. N. LUGENS, Walk. (Uraba lugens, Walk., Tortrices, 449; Coesa viduella, *ib.*, supp., 1,729; Toxoloma australe, Feld., Reis. Nov., pl. c., 16).
Melbourne, Gisborne, Dandenong.

81. N. METALLOPA, Meyr. (Proc. Linn. Soc. N.S.W., 726, 1886).
Melbourne.

MOSODA. Walk.

82. M. OPHIODES, Meyr. (Proc. Linn. Soc. N.S.W., 729, 1886).

83. M. CONSOLATRIX, Ros. (Ros., Ann. Mag., N. H., 381, 1885).
Gisborne, Melbourne. (Larvæ feed on lichen.—*G. Lyell.*)

84. M. SEJUNCTA, Feld. (Pitane sejuncta, Feld., Reis. Nov., pl., cxl., 24).
Melbourne.

85. M. SERVILIS, Meyr. (Proc. Linn. Soc. N.S.W., 731, 1886).
Gippsland.

XANTHODULE. Butl.

SCÆDORA. Meyr.

86. S. OMOPHANES, Meyr. (Proc. Linn. Soc. N.S.W., 731, 1886). Melbourne.

CHIRIPHE. Walk.

*87. C. PROCRENA, Meyr. (*loc. cit.*, 733, 1886). Melbourne.

88. C. DICHOTOMA, Meyr. (*loc. cit.*, 734, 1886). Melbourne.

PELOBROCHIS. Meyr.

HESTIARCHA. Meyr.

THALLARCHA. Meyr.

89. T. PHALAROTA, Meyr. (Proc. Linn. Soc. N.S.W., 736, 1886; Thallarcha phædropa, *ib.*, 737). Melbourne, Myrtleford.

On the authority of Dr. T. P. Lucas I place the above together.

*90. T. ALBICOLLIS, Feld. (Pitane albicollis, Feld., Reis. Nov., pl. cxl., 37).

*90A. C. CHRYSOCHOA, Meyr. (Linn. Soc. N.S.W., 740, 1886).

COMARCHIS. Meyr.

*91. C. JOCULARIS, Ros. (Mosoda jocularis, Ros., Ann. Mag., N. H., 381, pl. xi., 6, 1885). Melbourne.

92. C. PARTITA, Walk. (Eutane partita, Walk., Ch. Het., 64; Eutane tineoides, Feld., Reis. Nov., pl. cvi., 15; Pitane amanda, *ib.*, pl. cxl., 36). Melbourne.

*93. C. OBLITA, Feld. (Pitane oblita, Feld., Reis. Nov., pl. cxl., 23). Melbourne.

*94. C. SPARSANA, Walk. (Conchylis sparsana, Walk., Tortrices, 369; Pallene gracilis, Butl., Tr. Ent. Soc. Lond., 376, 1877). Melbourne.

95. C. ASPECTATELLA, Walk. (Œcophora aspectatella (alella), Walk., Tineina, 679; Tinea œcophorella, *ib.*, supp., 1,813). Melbourne.

96. C. OBLIQUATA, Lucas (Proc. Linn. Soc. N.S.W., 1,082, 1889). Melbourne.

ANESTIA. Meyr.

97. A. OMBROPHANES, Meyr. (Proc. Linn. Soc. N.S.W., 746, 1886).

EUTANE. Walk.

ASURA. Walk.

98. A. LYDIA, Don. (Pitane lydia, Don.; Walk., Bomb., 532; Asura gaudens, *ib.*, 485).
Fernshaw, Gisborne, Melbourne.

99. A. CERVICALIS, Walk. (Walk., Bomb., 484).
Gisborne, Melbourne, Myrtleford.

METACRIAS. Meyr.

SPILOSOMA. Stph.

100. S. FUSCINULA, Dbld. (Chelonia fuscinula, Dbld., Eyre's Disc., i., 438, pl. v., 4; Arctia fuscinula, Walk., Bomb., 616; (?) Phaos vigens Butl., P. Z. S., 1878, 383; Phaos nigriceps, *ib.*; Phaos notatum, *ib.*; Phaos nexum, *ib.*, 384; Phaos lacteatum, *ib.*, 384).

101. S. QUINQUEFASCIA, Lucas (Proc. Linn. Soc. N.S.W., iv., 1,085, 1889).
Melbourne.

102. S. GLATIGNYI, Le G. (Rev. Zool., 1841, 257; Chelonia pallida, Dbld., Eyre's Disc., i., 438, pl. v., 3; Ardices fulvohirta, Walk., Bomb., 710; Spilosoma subocellatum, *ib.*, 1,697; Spilosoma conferta, *ib.*, supp., 295).
Melbourne, Gisborne, Fernshaw, Moe.

103. S. OBLIQUA, Walk. (Bomb., 679; Ardices canescens, Butl., Cist. Ent., ii., 29; Spilarctia obliqua, *ib.*, 41).
Melbourne, Moe, Ringwood, Gisborne.

PHRAGMATOBIA. Stph.

AREAS. Walk.

104. A. MARGINATA, Don. (Phalæna marginata, Don., Ins., N. H.; Areas Moorei, Butl., Cist. Ent., ii., 23; Ill. Het., v., 28, pl. lxxxv., 2; Areas roseicostis, *ib.*, Cist. Ent., ii., 23).
Warragul, Melbourne.

DEIOPEIA. Stph.

*105. D. PULCHELLA, Lin.

I can find no record of this species from Victoria previously.

FAMILY—HYPSIDÆ.

NYCTEMERA. Hb.

106. N. AMICA, White (Agagles amicus, White, Grey's Disc., 482; Nyctemera annulata, Walk. (nec. Bdv.) Bomb., 391).
Melbourne, Gisborne, &c.

AMERILA. Walk.
HYPSA. Hb.
DIGAMA. Moore.

Family—LIPARIDÆ.

DIANASA. Walk.
ARTAXA. Walk.

PORTHESIA. Stph.

*107. P. HOLOLEUCA, Meyr. (Tr. Roy. Soc. S.A., xiv., 193).
Gisborne, Melbourne.

108. P. OBSOLETA, F. (Bombyx obsoleta, F., Ent. Syst., iii., 1, 463; Don., Ins., N. H., Liparis obsoleta, Bdv., Voy. *Astrolabe*, pl. i., Lep., 218, 3).
Gisborne, Melbourne, &c.

TRICHETRA. Westw.

109. T. MESOMELAS, Walk. (B. M. Cat., iv., 845).
Gisborne, Melbourne, Oakleigh, Bairnsdale.

110. T. MARGINALIS, Walk. (B. M. Cat., iv., 846).
Melbourne.

TEARA. Walk.

111. T. MELANOSTICTA, Don. (Bombyx melanosticta, Don., N. H., Liparis melanosticta, Bdv., Voy. *Astrolabe*, pl. i., Lep., 225, 7).
Gisborne, Melbourne, Camperdown.

112. T. TRISTIS, Lew. (Bombyx tristis, Lew., Prod. Ent., 9, pl. 8; Liparis tristis, Bdv., Voy. *Astrolabe*, pl. i., Lep., 223, 6; Trichetra (Bombyx ?) tristis, White, App. Grey's Ex. Disc. Aust., 479, fig. 2).
Melbourne, &c.

This is, I think, Rosenstock's *Teara pontificalis*.

113. (?) T. CONTRISTIS, Hb. (Epicona contristis (Phalæna vera, Leucoma, undata), Hb.; Samml., Ex. Schmett., ii., 9, 109, f. 217–218).
A doubtful species.

114. T. GUENEI, Newm. (Tr. Ent. Soc. Lond., N. S., iii., pl. 18, f. 9).

115. T. EDWARDSII, Newm. (*loc. cit.*, pl. 18, f. 10; Teara deficita, Walk., B. M. Cat., xxxii., 352, 1865; Teara indecora, *ib.*, 353).
Melbourne.

APINA. Walk.

116. A. CALLISTO, Dbld. (Dbld. (Agarista callisto), MSS.; Walk., Bomb., 756).

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL ANNOTATIONS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., LL.D., F.R.S.

(Continued.)

Acacia Rossei.

Glabrous, but somewhat glutinous; phyllodes crowded yet scattered, rather short, linear, curvedly short-pointed, slightly verrucular-rough, almost doubly thickened along the median line; stipules comparatively long, capillulary- or linear-setaceous; headlets of flowers on corymbously crowded stalks of evidently greater length, placed between stipules and diminutive leaves; bracts broadish below, thence gradually much pointed, sessile or stipitate; segments of the calyx five, linear-spoonshaped, about half as long as the corolla, separated to their base; fruits compressed, elongate-elliptic, their valves hard, outside densely beset with dark-brown membranous crisped excrescences; seeds placed transversely.

In the interior of South-Western Australia; communicated by Mr. W. Webb.

Branchlets mostly elongated, somewhat verrucular-rough, long retaining the stipules, the latter reminding of some such plants as Pultenæas. Seeds not obtained, but from the shallow cavities on the inner side of the valves their position could not have been longitudinal. When the tricentennial jubilee of the Dublin-University took place some months ago, the honour was shown to the writer of sending to him an invitation for sharing in that significant festival; thus a wish then arose, now fulfilled, to connect in commemoration of that scientific event the name of the illustrious Chancellor of that venerable seat of learning, the Earl of Rosse, K.P., with some rare member of the Australian floral world for a perpetual living record also here of the astronomic renown, which his Lordship inherited and so brilliantly sustains, and also to pay some homage to the great services in the cause of the principal Irish University by both these great astronomers. No other of fully 300 species of Australian Acacias has the almost lamellar-cuticular desquamation of the outer side of the fruit-valves; otherwise our new one stands systematically nearest to *A. Bynoeana* and *A. conferta*; but the former has more spreading and less quadrangular phyllodes, almost sessile headlets, short-lobed calyces and curved narrow fruits, while the last mentioned species shows shorter flatter as well as proportionately broader phyllodes; moreover yonder both belong to other geographic regions, and neither of the two has conspicuous stipules, in which respect *A. Rossei* approaches *A. cedroides.*

NOTES.

VICTORIAN MOTHS.—Lepidopterists are informed that a limited number of reprints of each part of Mr. Lower's "List of Victorian Moths," now in course of publication in the *Naturalist*, can be procured from the hon. librarian at a cost of 3d. per copy.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.—The proceedings of this Society for 1891–2 are to hand, and from the reports of meetings and excursions contained, though in an abridged form, it can be seen good work is being done. The Section is to be congratulated on the success of its efforts to secure the reservation of a national park, some 2,000 acres, on the south-western slopes of Mt. Lofty, within 15 miles of Adelaide by rail, having been perpetually reserved.

THE NATURAL HISTORY SOCIETY OF QUEENSLAND.—The first annual report of this Society, for 1892, records a very interesting year's work. Some 18 papers were read, dealing with different branches of Queensland natural history; and numerous fine exhibits of specimens, especially insects, were tabled during the year.

CATALOGUE OF AUSTRALIAN MAMMALS.—This handbook, recently issued by the trustees of the Australian Museum, Sydney, has been compiled from various sources, duly acknowledged, by Mr. J. Douglas Ogilby, F.L.S., and contains careful descriptions of all known mammals indigenous to Australia, with notes on allied fossil forms. The list contains 209 species, as well as eight well-marked varieties. Several of the 174 species of the last authentic list (Krefft's "Australian Vertebrata, Recent and Fossil," 1877) have been treated as synonyms or varieties of other species, for reasons given. The work includes a general introduction to the class Mammalia, with special reference to the osteology. The different orders, families, and genera are briefly defined, and their dentition, habits, &c., given; whilst dimensions, habitats, and references are given with each species, with other occasional notes—thus forming a guide which should be in the hands of every student of Australian Mammalology, the general plan and printing of the catalogue being excellent.

SEALING IN 1892.—During the Newfoundland sealing season of 1892 no less than 349,369 seals were taken by twenty vessels, besides which about 25,000 were captured in the Gulf of St. Lawrence. One vessel secured no less than 40,904, and the total catch is valued at £250,000. It is not to be wondered at, with this enormous destruction of life, that an extension of the close season is strongly urged. The whale fishery produced 10 right whales, 1,309 white whales, and 67 walrus, of a total value of £19,700. Four vessels went to the Antarctic Seas, but reports are not to hand from them yet, as they only left Port Stanley (Falkland Islands) to commence work on 11th December, 1892. The success of this venture is being eagerly watched.—T. Southwell, F.L.S., in *Zoologist*, March, 1893.

Field Naturalists' Club of Victoria.

President:

MR. H. T. TISDALL, F.L.S.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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A Meeting for practical work is also held on the fourth Monday in each month, at the Royal Society's Hall, at 8 p.m.

The proceedings of the Club are recorded in its journal—"The Victorian Naturalist." Annual Subscription, 7s., post free. (To members free.)

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor, Mr. F. G. A. Barnard, Kew.

Most of the numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Rev. W. Fielder, St. Kilda, at sixpence each; or in sets. Vol. I. (1884-85), 16 numbers, 7s. 6d.; Vol. II. (1885-86), 12 numbers, 6s.; Vol. III. (1886-87), 12 numbers, 6s.; Vol. IV. (1887-88) out of print; Vol. V. (1888-89), 12 numbers, 6s.; Vol. VI. (1889-90), 12 numbers, 6s.; Vol. VII. (1890-91), 12 numbers, 6s.; Vol. VIII., 12 numbers, 6s.; Vol. IX., 12 numbers, 6s.; each set with title-page and index for binding.

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THE

Victorian Naturalist.

Vol. X.—No. 4. AUGUST, 1893. No. 116.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary meeting of the Club was held in the Royal Society's Hall on Monday evening, 10th July, 1893. The newly elected President (Mr. H. T. Tisdall, F.L.S.) occupied the chair, and there was an attendance of some 50 members and friends.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library :—"Journal Bombay Natural History Society," vii. 4, from Society; "Transactions Science Society of Chili," vol. ii., 1892, from Society; "Index to Families and Genera of Masters' 'Catalogue of Australian Coleoptera,'" from Mr. C. French; "Catalogue of Periodicals, &c., received at Melbourne Public Library," from the Trustees; "Proceedings of the Academy of Natural Sciences of Philadelphia," 1892, part 2, from Academy; and "Journal of Pharmacy, June, 1893."

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that at the meeting for practical work held on Monday evening, 26th June, Mr. J. Shephard gave a demonstration of the principles of "The Illumination of Microscopic Objects," when there was a good attendance of members, who followed the subject with keen interest. A *résumé* of the evening's work appears on page 59.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. A. G. Fryett, A. E. Kitson, and C. A. Robinson were elected members of the Club.

PAPERS READ.

1. By Mr. A. J. Campbell, F.L.S., entitled, "A Decade in Australian Oology."

The author remarked that ten years had elapsed since he completed a series of papers, read before the Club, on "Australian Oology," which were subsequently issued as a manual, towards the end of 1883. At that time there were about 430 descriptions of Australian eggs recorded, while now there are 560 on record, some 80 of which were described and exhibited at meetings of the Field Naturalists' Club of Victoria. He briefly referred to other works in the oological field during the decade, and to the more notable finds during recent years, and gave descriptions of the eggs of the following birds, viz. :—Blood-stained

Cockatoo (*Cacatua sanguinea*, Gould), Western Long-billed Cockatoo (*Licmetis pastinator*, Gould), and the Porphyrio Crowned Lorikeet (*Trichoglossus porphyriocephalus*, Dict.), of which, so far as he was aware, no scientific description was on record. He then gave a somewhat lengthy criticism of "The Descriptive Catalogue of the Nests and Eggs of Birds Found Breeding in Australia," by A. J. North, F.L.S., Sydney, 1889, issued under the direction of the trustees of the Australian Museum, Sydney, and while praising the general character of the work, took the opportunity of pointing out a few inaccuracies and omissions, concluding his paper by giving a brief summary of his own work during the past twenty-five years, during which he had formed a collection of 470 species of Australian eggs, and announcing his intention of publishing shortly a complete work, entitled "The Nests and Eggs of Australian Birds."

The paper gave rise to some little discussion among the oologists present.

2. By Mr. H. T. Tisdall, F.L.S., entitled "A Species of Isaria."

In introducing the subject reference was made to three best known groups of parasitic fungi—viz., *Entomopthoreæ*, parasitic on dead flies; *Laboulbenieæ*, on beetles; and *Cordyceps*, to which group the species of Isaria described in the paper was referred. The specimen furnishing the description was discovered under a piece of charred timber by Mr. H. Giles, of Nar-Nar-Goon, in April last, the cocoon which constituted its home being judged by Mr. C. French, F.L.S., as that belonging to the Moth *Dorala ocellata*. Exhaustive details, supplemented by illustrative diagrams and preparations for miscroscopic examination, enabled members to follow very clearly not only the special characters of the group to which the species belongs, but also furnished useful data for the identification of any other "finds" in this direction.

The paper excited considerable interest, and Messrs. E. Anderson, J. Cox, C. French, C. Frost, and J. E. Prince joined in the animated discussion which followed.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. H. P. C. Ashworth.—Bird skins and Butterflies. By Mr. F. G. A. Barnard.—Growing fern, *Botrychium ternatum*, Swartz, with fruiting spike, grown by exhibitor. By Mr. A. Coles.—*Dendronessa sponsa*, American Summer Duck; *Circus assimilis*, Jardine's Harrier. By Mr. C. French, sen.—Extra fine specimens of *Cordyceps taylori*, or Vegetable Fungus, from Cape Otway district, Victoria; coloured drawings of new insects (drawings by Mr. C. C. Brittlebank); 32 newly described species of Aus-

tralian Amarygmid Beetles; new genus and species of Buprestid Beetle—viz., *Hypostigmodera variegata* (Blackburn), Queensland. By Mr. C. French, jun.—Orchid, *Dipodium punctatum*, flowering at Cheltenham in June; this orchid flowers generally in the hottest months. By Mr. J. Gabriel.—Large Oyster, taken off Williamstown. By Mr. H. Giles.—Species of Isaria, found at Gembrook, April, 1893. By Mr. H. F. Hill.—Larvæ of *Hepialus (?) robertsii*, with parasitic growth, from Auckland, N.Z.

After the usual *conversazione* the meeting terminated.

THE ILLUMINATION OF MICROSCOPIC OBJECTS.

In his preliminary remarks on the above subject, at the Field Naturalists' Club practical meeting on 26th June, Mr. J. Shephard pointed out that the methods intended to be illustrated had only lately been put forward in a form accessible to microscopists, and emphasis was laid upon the fact that once mastered they would do away with the uncertain results, of the common haphazard way of "twisting about the mirror until the whole field was bright," would give superior results, and would save valuable time. By means of diagrams drawn on the blackboard, Mr. Shephard explained the meanings of the terms—spherical aberration, chromatic aberration, achromatism, angular aperture, numerical aperture (N.A. as usually written), and critical image, defining the latter in Dallinger's words as "an image in which sharp, clear, bright definition is given throughout, free from all rottenness of outline or detail." The conditions of perfect illumination were then stated in these words—"that with transmitted light the object should be at the apices of two equal cones of light formed by the rays converging upon the object and diverging again to the limits of the objective," and it was pointed out that imperfections in even the best lenses necessitated some reduction in the illuminating cone. Touching the use of the concave mirror, the necessity of focussing it, and of the proper position of the diaphragm (some distance under the object—not, as was often thought, close up), as also the inadequacy of this last accessory for use with glasses of higher power than half-inch objectives, Mr. Shephard proceeded to the kernel of his subject—viz., the use of the substage condenser—and Dallinger was quoted again as saying—"Without a condenser a microscope is either (by construction) not a scientific instrument, or it is an instrument unscientifically used." Defining a substage condenser as "a lens or combination of lenses, either achromatic or chromatic, placed below the stage in order to produce a cone of light," several of the leading types were referred to, and it was asserted that the nearer completeness of correction was attained the better the result. As an example a much-used chro-

matic condenser was mentioned as being of N.A. 1–36, but owing to lack of correction only N.A. 5 was available for central illumination, the larger portion of the cone tending to fog the image if not stopped out. The steps to set up the microscope for the production of a critical image were then explained in detail, each step being written out and numbered for after reference. The ultimate aim was shown to be the production of an image of the source of light, in which the object could be seen immersed, both object and flame image being equally in sharp focus and centred. As this might result in only a portion of the field being illuminated, it was shown how, by using a condenser suitable for the objective, or an adjustable one, or by using the bull's-eye condenser in conjunction, this end could be secured where desirable. Stress was laid on the points that the diaphragm apertures should only be used for adjusting the illuminating cone to the angle suited to the objective used, not for modifying its intensity, which should be done by interposing blue glasses of suitable depth of tints, and that only in the image of the source of light, or "flame image," could a critical picture of the object be found. Then the speaker alluded to the effects produced at the back of the objective when viewed down the tube with ocular removed—effects which at once afforded a means of seeing that adjustments were properly made and that the cone of illumination was in proper relation to the cone admitted by the objective. After showing how critical pictures could be produced with dark field illumination, illumination with condenser alone, as also with condenser and mirror, the objection sometimes raised that condenser illumination is undesirable for other purposes than resolving diatoms was criticised, and the absurdity of attempting to use the high powers without a condenser was insisted upon since the mirror could only produce a cone of about 30° angle, whereas an objective of 100° requires about 75°. It was further argued from practical experience that while saving time—when once the process was understood—not only diatoms but objects such as Protococcus, Euglena, collared cells of sponges, sections of tissues, suctorial tentacles of Acineta, and nuclei of Amœbæ, were all better seen, and their structural details more readily made out when examined by proper combinations of objective and condenser.

At the conclusion of a clear and incisive address the members present examined two microscopes of Zeiss, both being provided with D objectives and No. 2 oculars, one being set up with an Abbé condenser for "critical" work, and the other with mirror only, the object being in each case the fine hairs on the tongue of a blowfly. This exhibit showed to those present the great superiority of condenser illumination, since the admitted uniformity of the glasses of this maker, and the well-known character of the object, removed elements of doubt, and enabled all to come to a speedy

decision favourable to the method. The two flagella in a living Protococcus were also shown with a half-inch objective of only 40° angular aperture, dark field illumination being employed, and the border of the transparent cellulose envelope was also rendered very obvious. Work was then undertaken by those present with their own apparatus and objects, Mr. Shephard being assisted by Mr. H. Grayson in the work of demonstrating the methods to individual members. Among the objects examined was a section of the sponge *Leucandra echinata*, prepared by Rev. W. Fielder, which afforded some of those present their first view of the much-described but rarely visible collars and flagella of the endoderm cells. Mr. W. H. Archer, F.L.S., exhibited a very fine homogeneous immersion lens of the new semi-apochromatic type, which gave very vivid pictures of the objects examined by it.

The nature of the subject was somewhat foreign to those set before members at these meetings, but of its practical value there can be no doubt, and Mr. Shephard's clear exposition will encourage many of those present to master a few of the methods by which they will be enabled to examine with accuracy and precision many details of interest and value to a microscopist, which have hitherto been known to them only through the labours of others, or, it may be, of unravelling some of those intricacies of nature which it is the object of the field naturalist to note and record.

NOTES ON THE LAND AND FRESHWATER MOLLUSCA OF CASTLEMAINE AND NEIGHBOURHOOD.

By F. L. Billinghurst.

Communicated by T. S. Hall, M.A.

(Read before the Field Naturalists' Club of Victoria, 8th May, 1893.)

The study of this branch of natural history appears, as far as I can learn, to have been somewhat neglected in Victoria, especially in the up-country districts. Scarcely anything has been added to our knowledge of this subject since Professor Tate published a list with remarks on the "Land and Freshwater Shells of Victoria," in the "Transactions of the Royal Society of South Australia," vol. iv., p. 71. The number of species at present recorded from the colony is comparatively small, but there is no doubt we possess many forms which have not yet come under the notice of our very limited number of collectors. I have apparently met with two such here already, and it is very probable I shall yet come across more. A diligent search within a radius of three miles of the town yielded me comparatively little. Our streams have been spoilt by mining operations, and our sandstone

ranges appear to be too dry and devoid of vegetation—except eucalyptus saplings—to harbour land forms. After thoroughly examining this radius, however, I started further afield, and was rewarded with much better success. I have now extended my radius to sixteen miles, but as this embraces a very large tract of country I do not pretend to have made anything like a thorough examination of it yet, but hope to do so by degrees. My best hunting-grounds at present are the granite ranges of Harcourt and Mount Alexander, about eight miles to the north; Expedition Pass reservoir, four miles to the east, on the junction of the granite and silurian slate and sandstone; Mount Franklin and the adjacent basaltic country, sixteen miles to the south; and the neighbourhood of Yandoit, twelve miles to the south-west, also basaltic. My list now comprises ten species, viz. :—Two Helices, one Succinea, two Limnæa, three Bulini, one Ancylus, and one Unio. They have nearly all been identified for me by Dr. Cox and Chas. Hedley, Esq., of Sydney, to both of whom I am greatly indebted for the very kind assistance they have given me in my endeavours to find out something about this branch of our local fauna. I will now proceed to make a few remarks on the various species.

CHAROPA TAMARENSIS, Petterd (described in Petterd's "Monograph of Tasmanian Land Shells," p. 30), from Launceston, Tasmania, and not hitherto known to exist elsewhere. Mr. Hedley writes that both he and Mr. Brazier compared my specimens with authentic examples received from Petterd, and there can be no doubt about the identification. I found this very minute species in the crater of Mount Franklin, but have not taken it nearer to Castlemaine yet. Mount Franklin, be it noted, is *north* of the Dividing Range. Query: How did a species hitherto recorded from Tasmania *only* get there?

CHAROPA RETEPORA, Cox.—Dr. Cox thought at first this was an undescribed species, but eventually identified it as one he had named from specimens received from Flinders Range, South Australia. It is a pretty little shell, of a light horn colour when the animal—which is black—is extracted; and the whorls, when examined under the lens, are seen to be beautifully ribbed. It is not uncommon in the ranges north and east of the town, and I also took it in the crater of Mount Franklin, in company with *H. tamarensis*. It is found under logs and stones, in gullies, and also on sides and summits of hills. The specimens vary in that some are umbilicated and others not.

SUCCINEA AUSTRALIS, Férussac.—I took two single specimens of this shell under an old log quite near the town. Later on I found a considerable number under the bark of eucalyptus trees in the Expedition Pass Reservoir reserve, and since then I have found it to be very common at Harcourt, under the bark of trees.

LIMNÆA BRAZIERI, Smith.—Dr. Cox wrote:—"This is a species of very rare occurrence. I have got a single specimen near Sydney, and afterwards from one other locality of New South Wales." I found this species to be very plentiful on watercress in a little stream emanating from a mineral spring by the roadside near Yandoit. I have also taken what appears to be the same shell at Expedition Pass, in a dam near Castlemaine, and in a dam near Chewton. Castlemaine, therefore, appears to be its home. It does not appear to attain any size. The largest specimens I have taken were at Yandoit, and measure little over $\frac{3}{8}$ of an inch.

AMPHIPEPLEA PAPYRACEA, Tate, originally described in "Trans. Roy. Soc. S. Aust.," vol. iii., p. 103, pl. iv., fig. 5, as *Limnea papyracea*, which name was changed to the above in the "Proc. Roy. Soc. of Tasmania, 1884," p. 216. It has been previously recorded from Victoria by the late Mr. J. F. Bailey, who collected it at Merrigum. I have only taken this shell once, in a rain water dam off the Daylesford road, about twelve miles from Castlemaine. This dam was partly dried up when I visited it, but I found a quantity of dead shells and a few live ones of this species in it. The largest specimen I took measured $\frac{9}{16}$ of an inch.

BULINUS TENUISTRIATUS, Tate.—This is our commonest shell, and is found everywhere. Expedition Pass, the little Yandoit stream, the lake in our Botanical Gardens, a mining dam at Fryerstown, several little streams and ponds at Harcourt, have all yielded it in quantities. I have only one note to make about this shell. The Yandoit specimens were covered, when first dried, with a greenish coating. This, however, soon disappeared. The Limneæ from the same stream did not, as far as I observed, exhibit the same peculiarity. The shell is light horn colour and transparent in young specimens; the adults are brown and opaque.

BULINUS PECTOROSUS, Conrad.—I have only taken this species once, in a ditch called Limestone Creek, half-way between Guildford and Yandoit. The shells are black.

BULINUS ALICIÆ, Reeve, var. *cingulatus*, Clessin.—I have had a curious experience with this shell. Some months ago I took a single specimen at Expedition Pass, but though I searched often and diligently, could never come across another. When I visited the rain water dam on the Daylesford road before mentioned, I found it full of them in all stages of growth. Within the last few days I have taken three more at Expedition Pass. The distance between the localities is 22 miles, and I have never found the species anywhere else. It is a striking shell, the whorls being coronated, and it seems to vary a good deal in shape. This form was described from South Australia (as a

species) in the Conchylien Cabinet Monograph "Physa," p. 364, pl. li., fig. 8. In the National Museum, Melbourne, are unnamed specimens labelled—"Locality, Gunbower."

ANCYLUS AUSTRALICUS, Tate.—This little limpet form is plentiful at Expedition Pass, and I also found it in the Yandoit stream, but nowhere else yet. All my specimens were on the stalks of bulrushes.

UNIO (probably *australis*).—I have not had this shell identified yet. I took a specimen and a half in the Harcourt Reservoir, but since learned that a number were brought down a few years ago from the Murray by some disciples of the rod and line and thrown into the reservoir, in the hope that they would breed and provide bait for fishing there; but these hopes do not appear to have been fulfilled, as I waded about in the water for over an hour looking for them, with the result above mentioned. I have since heard that Unios, or, as my informant termed them, "Mussels," are plentiful in a stream about twelve miles from town, so shall go out there shortly, I hope.

Besides the foregoing we have an imported Helix, *H. aspersa*, Linn. Specimens of this pest were brought up from Melbourne some time back by two local residents, who let them loose in their gardens, "because they reminded them of home." At present their neighbours, who grow peas, &c., are reminded too forcibly about home, and use unparliamentary language on the subject.

We are also pestered with three imported slugs—*Amalia gagates*, *Limax agrestis*, and *Limax flavus*. The two former seem to have spread themselves all over the district, and are to be found under stones, &c., on all the hillsides and in the gullies far and near. *Limax flavus* I have, so far, only taken in my own fernery, converting choice ferns into slug.

En passant, I might say that a good way to get rid of slugs in a garden is to lay little heaps of bran or pollard about and go round with a light after dark. They will be found feeding on the heaps, and can be collected into a receptacle and killed with boiling water or given to the ducks, who are very fond of them. Curious to say, the pollard heaps in my garden appeared to attract a number of specimens of a planarian worm—*Geoplanus alba*, I think. What for I don't know, as I always understood they were carnivorous.

In conclusion, I would like to say that I am very anxious to get land and freshwater shells from all parts of Victoria, and if any members of the Field Naturalists' Club, or others, would kindly send me notes or specimens I should be exceedingly obliged. For the latter I can offer good exchange in foreign shells, or would endeavour to send specimens of any branch of local natural history which might be preferred.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part IV.

UROCOMA. Meyr. (?)

117. U. LIMBALIS, H. S. (Porthesia limbalis, H. S.)

ŒNOSANDA. Walk.

118. Œ BOISDUVALII, Newm. (Tr. Ent. Soc., N. S., iii., p. 286; Œnosanda Duponchelii, Newm. (?), Walk., Bomb., 1,713).

I can find no record in Tr. Ent. Soc. Lond., 1856, of this species. Walker (B. M. Cat., 1,713) states that both sexes of this species have simple antennæ, and gives Newman as the authority. This is a mistake, as the male has pectinations very long. The sexes are very dissimilar, the male being slaty-grey, the female shining snow-white, with a longitudinal black mark throughout the forewings.

PTILOMACRA. Walk.

119. P. SENEX, Walk. (Bomb., 1,068; Ptilomacra antiqua, Walk., App., pub. in 1869).

CHELEPTERYX. Grey.

120. C. COLLESI, G. R. Grey (Tr. Ent. Soc., i., 122; Saturnia Laplacei, Feist., Voy. de *La Favorite*, v., supp., 26, pl. 8–9).
Oakleigh, Gisborne, Melbourne, &c.

DARALA. Walk.

121. D. DENTICULATA, Newm. (Teara denticulata, Newm., Tr. Ent. Soc., N. S., iii., p. 283; Darala basigera, Walk., Bomb, 372; Darala undulata, Feld.)
Melbourne, Gisborne, &c.

122. D. OCELLATA, Walk. (B. M. Cat., Bomb., 887).

123. D. PROTOCENTRA, Meyr. (Tr. Roy. Soc. S.A., xiv., 191).
Fernshaw.

124. D. ASTERIAS, Meyr. (Tr. Roy. Soc. S.A., xiv., 192).
Melbourne.

125. D. REPLETA, Walk. (Bomb., 896).
Melbourne, &c.

126. D. CHELEPTERYX, Feld.

127. D. CENSORS, Walk. (B. M. Cat., Bomb., 369).
Gisborne, Melbourne, Oakleigh, &c.

†128. D. SUCCINEA, Lucas (Proc. Linn. Soc. N.S.W., vi., 290).
Wimmera.

SCÆOPTERA.

129. S. MARGINALIS, Walk.
Hamilton, Melbourne, &c.

OCNERIA. H. S.

LYMANTRIA. Hubner.

PTEROLOCERA. Walk.

130. P. AMPLICORNIS, Walk. (Bomb., 884).
Oakleigh, Gisborne, Melbourne.

TEIA. Walk.

131. T. ANARTOIDES, Walk. (Bomb., 804).
Melbourne, &c.

ORGYIA. Ochs.

132. O. SEMIFUSCA, Walk.

FAMILY—BOMBYCIDÆ.

TRILOCHA.

PINARA. Walk.

"This genus was referred by Walker to the Arctiadæ. The typical species consisted of three female specimens of his genus Entometa (Psychidæ); the female of the fourth, however, was referred to its proper genus, Opsirhina."—Butler, Tr. Ent. Soc. Lond., 1886.

I have gone to considerable trouble in trying to make out what Walker really meant, but I must admit that I am far from satisfied. The genus Entometa (Walk.) should consist of those insects with semi-hyaline wings and usually apterous females, and referable to the Psychidæ. His genus Opsirhina must merge into Pinara, as *Opsirhina fervens* is but the female of *Entometa despecta* (Walk.), and *Pinara cana* is the female of *Nadiasa parvigutta*, which genus also must sink. The species of this genus are all very variable, especially in the hind wings of the male.

† Since writing the above I find that this name—*i.e.*, *succinea*—is identical with *D. varia*, Walk. (Bomb., 891). Tepper also named it *Opsirhina tintinarra* (Com. Nat. Ins. S.A., ii., p. 29). Walker's name must stand.

133. P. CANA, Walk. (Pinara cana, female, Walk., B. M. Cat., 761 and 1,711; Nadiasa parvigutta, male, Walk., *ib.*, 1,015; Entometa divisa, male, Walk., Bomb., 973; Opsirhina punctilinea, male, Walk.)
Gisborne, Melbourne, Oakleigh, &c.

134. P. OBLIQUA, Walk. (Bomb, 973).
Gisborne, Melbourne.

135. P. FERVENS, Walk. (Opsirhina fervens, female, Walk.; Entometa despecta, male, Walk., Char. Und. Het., 67; (?) Opsirhina flexicosta, Feld.)
Melbourne, Gisborne, &c.

This fine species is very variable, especially in the hind wings of male, which vary from bright orange to deep chocolate. I have bred numbers; and the larvæ are variable in colour. It stands in some collections as *Pinara cana* and *divisa*, but one has only to compare the descriptions to see the error.

136. P. (?) NANA, Walk. (? Opsirhina nana, Walk., 1,421).
Gisborne, Melbourne, &c.

I am doubtful if this is really Walker's insect. It does not satisfactorily suit his description. I have also had it sent under the name of *Odonestis australasiæ* (Fab.), but in the absence of the proper literature I am unable to identify it with certainty.

137. P. RUFA, Walk. (Gastropacha rufa, Walk., Bomb., 1,395).
Melbourne.

COSMOTRICHE. Hb.

This is another genus which sadly requires defining. It approaches Pinara somewhat, as also Bombyx. Perhaps it should be merged into the latter.

138. C. EXPOSITA, Lew. (Bombyx exposita, Lew., Prod. Ent., pl. 7, p. 8; Pæcilocampa brevis, Walk., Bomb., 571, 1865; Pæcilocampa hebes, *ib.*, 1865).
Melbourne, Western District.

139. C. VITULINA, Don. (Bombyx vitulina, Don., Ins., N. Holl.; Liparis vitulina, Bdv., Voy. *Astrolabe*, pt. i., p. 217, i.)
Melbourne, Oakleigh, &c.

BOMBYX. Schrk.

140. B. CHLOROPHRAGMA, Meyr. (MSS.)
Melbourne.

141. B. ALBIFINIS, Walk. (Callia (Bombyx) albifinis, Walk., Bomb., 1,483; Cosmotriche notodontina, Feld.)
Fernshaw, Melbourne.

142. B. TRIMACULA, Walk. (Mecytha trimacula, Walk., Bomb., 1,756).
Gisborne, Melbourne, Fernshaw.

143. B. HOMOSPILA, Meyr. (MSS.)
Gippsland.

144. B. OCHROCEPHALA, Feld. (Dicreagra ochrocephala, Feld.)
Gisborne, Melbourne.

FAMILY—NOTODONTIDÆ.

DANIMA. Walk.

145. D. BANKSIÆ, Lew. (Prod. Ent., 10, pl. 9; Harpya banksiæ, Bdv., Voy. *Astrolabe*, Lep., 238).
Melbourne, Gisborne, Healesville, &c.

HYLEORA. Dbld.

146. H. CAUSTOPIS, Meyr. (MSS.)
Gisborne, Melbourne, &c.

147. H. EUCALYPTI, Dbld. (Ann. Nat. Hist., 2nd ser., iv., 217; (?) Hyleora sphinx, Feld.)
Melbourne, &c.

148. H. DILUCIDA, Feld.
Melbourne, Inglewood.

FAMILY—SATURNIDÆ.

ANTHERÆA. Hb.

149. A. EUCALYPTI, Scott.
Melbourne, &c.

150. A. HELENA, White (Antheræa intermedia, Lucas, Proc. Linn. Soc. N.S.W., iv., 1,091, 1889).
Gippsland, Melbourne.

FAMILY—STROPHIDIADÆ.

STROPHIDIA. Hb.

STESICHORA. Meyr.

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The Author of each article is responsible for the facts and opinions he records.

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THE

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Vol. X.—No. 5. SEPTEMBER, 1893. No. 117.

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Field Naturalists' Club was held on Monday evening, 14th August. Mr. H. T. Tisdall, F.L.S., the president, occupied the chair, and there was an attendance of some 50 members and friends.

MEETING FOR PRACTICAL WORK.

It was reported that a meeting for practical work was held on Monday evening, 24th July, when Rev. W. Fielder, Assistant Demonstrator in Biology in the University, gave a practical demonstration on the dissection of the leech. Members had provided themselves with a dissecting dish and knives, forceps, scissors, pocket lens, drawing book and coloured crayons, and after a few directions and diagrams had been committed to paper, active operations commenced. Mr. A. G. Fryett gave active assistance in demonstrating to individual members, and altogether very fair progress was made in the work. It is proposed to continue the series of demonstrations month by month, such forms as the snail, crayfish, and frog being added to the list.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library :—"Proceedings of the Linnean Society of New South Wales," 2nd series, vol. viii., part 1, from Society; "Proceedings of the Royal Society of Tasmania, 1892," from Society; "Transactions of the Royal Society of South Australia," vol. xvi., part 2, and vol. xvii., part 1, from Society; "Transactions of the New Zealand Institute," xxv. (1892), from Society; "Catalogue of Marine Shells of Australia and Tasmania," part iii., by J. Brazier, from Trustees Australian Museum; "Handbook of Destructive Insects of Victoria," part 2, by C. French, F.L.S., from the author.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. E. Allman and E. Griffiths were duly elected members of the Club.

PAPERS READ.

1. By Rev. W. Fielder, entitled, "Description of an Infusorian (one of the Acinetidæ) found at Heidelberg."

The paper was illustrated by diagrams designed to show the distinctive features of the species described as compared with other members of the group, the animacule under consideration being noteworthy as possessing a lorica made up of seven plates, together with extremely long tentacles.

Messrs. H. R. Hogg and J. Shephard added some points of interest to the subject.

2. By Mr. Dudley Le Soüef (communicated by Rev. W. Fielder), entitled, "A Visit to the Ebenezer Mission Station."

The natural history facts recorded related principally to the bird life of the Wimmera, and some extremely good slides, made from photographs taken on the spot, gave members a clear conception of the habits and haunts of many of the birds which breed in the district. The limelight views, which were shown by Mr. J. Searle, were much appreciated.

A vote of thanks was unanimously accorded to Mr. Le Souëf for his interesting contribution.

NATURAL HISTORY NOTES.

Some interesting botanical notes were communicated by Messrs. G. Coghill and T. S. Hart, and the chairman called attention to the publication of the second part of "A Handbook of the Destructive Insects of Victoria," prepared by order of the Victorian Department of Agriculture by Mr. C. French, F.L.S., a notice of which appears on page 79.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. F. G. A. Barnard.—Flowering specimen of *Richea pandanifolia* (Epacrideæ) from Hobart. By Mr. G. Coghill.—White form of *Kennedya monophylla*, found growing wild at Tunstall. By Mr. C. French, F.L.S.—Beetles from the Transvaal; boots for the bush, invented and patented by W. Lockhart Morton, South Yarra. By Mr. C. French, jun.—Eggs of Crested Tern, from North Queensland. By Mr. G. E. Hill.—Specimen of *Pseudodelma impar*, caught at Royal Horticultural Gardens, Burnley. By Baron von Mueller, K.C.M.G.—*Helichrysum cunninghami*, Bentham, Upper Goulburn River (W. Gates); new for Victoria; previously recorded from Mount Danger, on the Hunter River, only, but perhaps occurring in many interjacent places, and probably overlooked on account of its resemblance to *Humea ozothamnoides*. By Mr. J. Shephard.—*Volvox globator* (under $\frac{1}{14}$ immersion lens, interesting details, such as the strands of protoplasm connecting the various individuals, the contracting vacuoles, &c., being very clearly brought out).

After the usual *conversazione* the meeting terminated.

A DECADE IN AUSTRALIAN OOLOGY.

By A. J. Campbell, F.L.S.

(Read before the Field Naturalists' Club of Victoria, 10th July, 1893.)

Ten years have elapsed since I completed a series of papers on Australian oology, which I had the privilege of reading before this Club. As some of you are aware, these papers were subsequently issued in the form of a manual, at the end of 1883. It was mentioned at the time that the manual had no pretensions to anything approaching a complete work, but was intended to act as a stimulus, and to show how much there remained to be accomplished in the oological field. I am aware that a few errors have crept in, which our more recent or perfect knowledge has brought to light; but it has been well said, "Show me the man who never makes a mistake, then I'll show you the man who never does any work."

Since 1883 Australian oology has made rapid strides. Then there were about 430 known descriptions (albeit some very imperfect) of our eggs; now we possess 560, about 80 of which were described and exhibited before the Field Naturalists' Club, including a score which remain unique, inasmuch as to-day they are the only descriptions extant of the species enumerated.

However, many oologists have sprung up in the Club, and I verily believe indirectly through my papers. I may mention the names of Messrs. J. Gillespie, Ed. Cornwall, R. Hall, D. Le Souëf, G. A. Keartland, J. Gabriel, C. French, jun., C. and T. Brittlebank, E. Dombrain, Dr. W. M'Gillivray, and others, who possess in a greater or less degree first-class collections. They are quite a host at my back, and individually aid me much in my work. There are also many friends in the other colonies. By the way, I may say that an ornithologist is not necessarily an oologist, but a working oologist must perforce be an ornithologist, and to be successful must have enthusiasm combined with singleness of purpose, besides possessing the keenest eyesight and very discriminating ears.

Then there are those who went into letter-press with descriptions of eggs. Dr. Lucas described a few; Colonel Legge recorded some of the sea-birds' of Tasmania; Mr. R. D. Fitzgerald other eggs from the Richmond and Clarence districts; Messrs. W. T. White and Tryon furnished the first descriptions of Australia's only Stork (*Xenorhynchus australis*, Latham) in Queensland. Meanwhile Dr. E. P. Ramsay and Mr. A. J. North, F.L.S., have added valuable contributions to Australian oology.

Of those who have gone to the "eternal habitations" during the last decade, I would mention that distinguished oologist and the most agreeable of correspondents, the late Dr. Kutter, of

Cassel, Germany. True, he was not particularly an Australian oologist, but he performed some excellent work in connection with eggs collected in the Austro-Malayan regions, which, as you are aware, contain many Australian forms. I should also name the late Mr. Thos. H. Potts, of New Zealand. He was the first to describe some of our Australian species, notably the eggs of the Bittern (*Botaurus poicilopterus*), the Australian Egret (*Herodias alba*), and many of the sea-birds. Mr. Potts was a very fascinating and descriptive writer. One was inclined to linger with pleasure over his pages. I am sure his account of a visit to the breeding haunts of the Great White Egret, in which the reader is brought face to face with the ornamental figures of the birds perched on dead tree branches amid the native grandeur of the river and mountain scenery of New Zealand, reads more like a poem than prose. Mr. Potts was a very old and honourable pioneer, and the quintessence of a field naturalist.

At the last International Ornithological Congress, held at Buda-Pest, a committee was appointed to investigate the nidification of the peculiar mound-raising birds of Australia—the Talegallus, Leipoa or Mallee Fowl, and the Megapodes—and for the deliberations of the committee a member of your club was invited to contribute information.

Items of the most recent interest were the finding of a nest and egg* of Victoria's Rifle Bird (*Ptilorhis victoriæ*, Gould) by Messrs. D. Le Souëf and H. Barnard, on the Barnard Islands, off the Queensland coast, and the nest and eggs of another gorgeously plumaged bird—the Regent Bird (*Sericulus melinus*, Latham)—brought to the light of oological knowledge indirectly through my visit to the Richmond River district, N.S.W. Previously the only egg described was taken from the oviduct of a bird.

In going through my collection, I find I possess three species of eggs—viz., the Blood-stained Cockatoo (*Cacatua sanguinea*, Gould), Western Long-billed Cockatoo (*Licmetis pastinator*, Gould), and the Porphyrio-crowned Lorikeet (*Trichoglossus porphyrocephalus*, Dict.)—which, as far as I am aware, are still undescribed; therefore, in order that our remarks may be up to date, I give their descriptions, with data, in the form of an addendum to this paper.

I now come to perhaps the most important item during the decade—viz., the publication, in 1889, by order of the Trustees of the Australian Museum, Sydney, of an illustrated work, entitled "A Descriptive Catalogue of the Nests and Eggs of Birds Found Breeding in Australia and Tasmania," written under the direction of Dr. E. P. Ramsay, F.R.S.E., curator, by Mr. A. J. North, F.L.S.,

* A nest and egg previously described by me and these now mentioned are contrasted in the *Naturalist* for January, 1892.

Assistant in Ornithology at the Museum, and a member of the Field Naturalists' Club of Victoria, and to which work supplements have since been added. It is, perhaps, rather late in the day for critical remarks, but as this is the first opportunity I have had, and as the work has been endowed and issued with all official authority, I deem an honest comment upon Mr. North's labours will not, even now, be out of place.

As a "catalogue," the work is certainly very descriptive, although the author, with modesty, states that the "remarks on each species are necessarily very brief; but, in order to somewhat relieve the monotony of one technical description following another, and where eggs have been previously described, I have given in full, in some instances, papers contributed at various times by Dr. Ramsay to the *Ibis*, entitled 'Notes on Birds Breeding in the Neighbourhood of Sydney,' and, in addition, given extracts, which I thought might prove of interest, from other papers furnished by the same author to kindred societies and publications." There are about 150 such descriptions by Dr. Ramsay. The "Catalogue" is a monument of laborious research and painstaking work, which can only be appreciated and understood by those who undertake such work. While going through the collection of eggs at the Museum, and others, Mr. North's experience as a collector has enabled him to describe only authenticated specimens and to discard unreliable evidence. As far as I have looked into the work I have found only a few inaccuracies—one, in particular, I shall point out further on.

The common name of the bird has properly appeared under the scientific title of the species of egg described. The matter of common names for Australian birds to be adopted in all the colonies is before the Science Association, and in the able hands of Colonel Legge. What is the utility of our calling a bird the Wattled Plover when another colony calls it a Lapwing, while a third calls it a "Pee-wee." Now that our indigenous birds are becoming scarce, and Government are being urged towards proper protection, we must adopt for a bird one common name, because the "Game Acts" schedule birds by their vernacular titles, and the law may be defeated, as it often is. A "sportsman" shoots a plover out of season: when properly summoned, he escapes justice because he proves the bird shot is known as a "Pee-wee."

Mr. North also retains that necessary adjunct needed by all oological students—namely, the geographical distribution of the species. But I fail to see why he has so regularly placed in parenthesis "Ramsay" after nearly all the localities, when the immortal Gould recorded many of them years ago. "Honour to whom honour is due" is a good axiom, and Dr. Ramsay's reference should have been claimed only for extension of localities hitherto unrecorded, or for corrections.

The eggs are described in a clear and lucid manner, and dimensions given to the 100th part of an inch, and in many cases of every specimen in a set or clutch. The description I particularly take exception to is the Gallinule (*Gallinula tenebrosa*, Gould). Mr. North has evidently re-described the same set of eggs that Dr. Ramsay used in the "Proceedings Linnæan Society N.S.W.," vol. vii., p. 56 (1882), and I informed Dr. Ramsay I was of opinion he had described Rail's eggs instead. And so sure was I of it that I took an opportunity of personally collecting the eggs of the Gallinule in an arm of Lake King, Gippsland, where the birds were numerous. I also shot a pair of birds, which, together with eggs, I presented to Dr. Ramsay, at the Australian Museum, in order that he might have an opportunity of correcting his own error. He has not, however, seen fit to do so. They have probably described the eggs of the Red-necked Rail (*Rallina tricolor*, Gray), instead of the Gallinule, which is a larger bird. Here are the cardinal points of their own two descriptions of the eggs, given in parallel columns, which it will be seen are almost identical:—

Gallinule (page 325).—Pale creamy white—blotched with reddish chestnut and lilac spots. First egg measured 1·53 x 1·15 inches.	Red-necked Rail (page 330).—Pale cream—spots reddish chestnut, and a few of lilac tinge. First egg measured 1·55 x 1·1 inches.

I think Mr. North, as I have proved, will find that the egg described as the Black-bellied Storm Petrel (*Procellaria melanogaster*, Gould) should really be that of the Diving Petrel (*Pelecanoides urinatrix*, Gmel.) His dimensions coincide with those of eggs I obtained from the same locality, and my specimens were accompanied by one of the birds found hatching in the burrows. I am somewhat surprised at Mr. North's statement that the Australian Gannet (*Sula serrator*, Banks) lays two eggs instead of one—a fact which we may verify during our forthcoming expedition to Flinders Island, where there is a nursery of Gannets five or six acres in extent on a rocky islet off the larger island.

Some of the notes embodied from a valuable correspondent, Mr. K. H. Bennett, are very entertaining, especially the chapter on the Buzzard in reference to the supposed smashing of Emu eggs by the bird of prey, and the account of a visit to the rookery of Ibises. The notes clearly demonstrated the force and value of data taken on the spot. The more costly edition of the work is beautifully illustrated, reflecting great credit upon the artists concerned. Plates iv. (Hawks' eggs), xi. (Nightjars' and Bower Birds'), and xvi. (Dottrels' and Quails'), apart from their scientific value, are really pictures.

Without wishing to detract in the slightest degree from the merits of Mr. North's work, one is inclined to be a little disappointed at its conservative character, if I may so express myself.

It is true it only purports to be a catalogue of nests and eggs of birds "found breeding in Australia and Tasmania." Why not of Australian birds wherever they breed—whether the Albatrosses in their far-off southern homes, or the Plovers that lay away northward towards the arctic circle? The nests and eggs of the Australian Curlew and Australian Snipe are undiscovered yet. When found, are they to be excluded from an Australian oology because, perchance, they have been taken in Eastern Siberia or Japan, whither it is known the birds resort?

Then, again, coming nearer home, there are many descriptions of authenticated eggs of birds found breeding within Mr. North's own prescribed limits, which have appeared in the proceedings of this Club, and which if embodied in Mr. North's catalogue would have undoubtedly increased its usefulness. Take, for instance, the nest and eggs of the Uniform-coloured Honey-eater (*Stomiopera unicolor*, Gould) from Northern Queensland, or the nest and eggs of the most elegant of Honey-eaters—the Helmeted (*Ptilotis cassidix*, Jardine), taken near Lilydale during the first camp-out of the Club, November, 1884, or the pretty home and contents of the rare White-bellied Robin (*Eopsaltria leucogaster*, Gould) of Western Australia, whose generic appellation will have to be altered in consequence of their discovery. Gould classed the White-bellied Robin with the *Eopsaltricæ;* now it will have to share with its dusky Tasmanian cousin the title *Amaurodryas*. Thus the votaries of oology do claim to be of scientific importance sometimes. Surely, then, a catalogue cannot be considered complete up to date that excludes twenty or thirty such descriptions, and, moreover, of eggs known to collectors. When I first heard of the "Catalogue" I communicated with Dr. Ramsay, purely in the interests of Australian research, and, that the work should be as complete as possible, offered to place my specimens—in fact, the whole of my collection—at his disposal; my offer, however, was not acknowledged.

This brings me to the conclusion of my article, and as I commenced with personal references, so likewise I propose to close it. It is now twenty-five years since I took the field in earnest, my collection numbering a total of 470 species of Australian eggs. I had hoped to have obtained 500 in the quarter of a century; but it is hard work when one nears the top of a hill. However, I have the satisfaction of knowing, and can say without fear of contradiction, it is the largest individual collection of purely Australian eggs in the world. Moreover, I have not confined myself to specimens only, but have collected every available data bearing upon the nidification of our birds. Of course, both as regards specimens and notes, I have been ably assisted by enthusiastic friends in various parts of Australia; but in order that there may be a stamp of individuality, or a personal strain, throughout my

researches, and not all closet work, during the best breeding months for the feathered tribes I have visited and dwelt in the luxuriant tropical scrubs of North-eastern Australia, attractive for the great variety of gorgeous birds, the great forests of the south-east and Tasmania, and the forests of the beautiful-leafed eucalypts and noble karri in the West. I have searched for hidden secrets in the waterless tracts of the Mallee, the saltbush plains, the pine ridges of the interior. The polygonum swamps and reedy lagoons deterred me not from wading in to investigate strange stories of our water fowl, notwithstanding such places likewise breed innumerable leeches, mosquitos, snakes. Then, upon the track of wild seabirds, I was allured on to many a rocky islet off the coasts, often at mortal risk ; but the greater the risk the better seemed the adventure. With genuine delight and with joyful companions I spent some days and nights on islands girt about with coral strands, under the pacific influence of the Great Barrier Reef. On the mainland we could see the fires of the most ferocious cannibals in Australia. With my own Club I joined in the expeditions to the romantic islands in our Straits ; while alone I proceeded to Western Australia, where for three days I was tossed about on the Indian Ocean in a 15-ton lugger, in order to reach these singular mushroom-shaped limestone rocks, Houtman's Abrolhos. My cabin was the hold of the craft, my pillow was my knapsack. The "skipper" apologized that he had only cold mutton on board. I replied, "Thanks, I shall need nothing." All thoughts of the terrible *mal-de-mer* were gone as I sprang ashore, when I found not only a score of species, but thousands upon thousands of birds engaged in the task of incubation or hovering around. Day and night their voices unceasingly filled the air. There were birds breeding upon the saltbushes, birds breeding beneath the bushes, and birds breeding under the ground below the bushes—literally tier upon tier. On an adjacent island another remarkable sight greeted me. Countless forms of dark-plumaged Noddies (the Lesser) were perched upon mangroves. At intervals, without any apparent cause, these sea birds would simultaneously rise and completely obscure the horizon, so great were their numbers. Closer inspection proved that the mangroves were loaded with their seaweed-built nests. The birds occupying the lower levels had a very unenviable position, and had a bedraggled and woe-begone appearance, from the droppings of live guano from their brethren in the upper flats. Such were some of the scenes by day. By night the locality was filled with the moaning and human-like cries of nocturnal Petrels, which, when accompanied by the howling wind and the distant booming of the billows on the outer reef, was a weird experience never to be effaced from my memory.

Now, I have endeavoured to give a brief *résumé* of the last

decade touching egg matters, and ere we are far into the next I hope (as it has been a life-long desire) to place before you a complete work on "The Nests and Eggs of Australian Birds."

(ADDENDUM.)

THREE HITHERTO UNDESCRIBED EGGS OF AUSTRALIAN BIRDS.

By A. J. Campbell, F.L.S.

(Read before Field Naturalists' Club of Victoria, 10th July, 1893.)

Cacatua sanguinea, Gould (Blood-stained Cockatoo).

Locality—Northern Territory, Queensland, New South Wales, and interior of South Australia.

Two eggs taken in the interior by Mr. A. A. Dombrain are white, of a firm texture, and inclined to oval in shape. Dimensions—(1) 3·73 x 2·8 cm., (2) 3·79 x 2·94 cm.

Mr. Herbert Kenny, while at Cooper's Creek, wrote me:—"At times the Blood-stained Cockatoos are to be seen in immense flocks. In the breeding season you may see the blacks bringing home their dilly bags full of eggs and young ones of all sizes, from those just out of the shell to fully fledged ones." Mr. Kenny sent me a set of eggs, with the following interesting data :—"Eggs of Blood-stained Cockatoo taken from gum-tree on Innaminka waterhole, Cooper's Creek, within a few yards of spot where Burke the explorer perished. The nest contained four eggs, which varied in size. Taken 17th August, 1890. Saw blacks with eggs latter end of July."

Licmetis pastinator, Gould (Western Long-billed Cockatoo).

Locality—Western and North-western Australia. Eggs white and elongated in shape. Dimensions—(1) 4·9 x 3·1 cm., (2) 5·0 x 3·06 cm.

Mr. Tom Carter, of near Carnarvon, Western Australia, took three eggs, on the 22nd September, 1888, from a hollow tree, but he states these Cockatoos sometimes breed in holes in the rocks, in gullies, and on one occasion (1st October, 1892), 25 miles inland, he found the young of a Long-billed Cockatoo in a large White Ant hillock, though gum-trees were fairly plentiful in the neighbourhood.

Trichoglossus porphyrocephalus, Dict. (Porphyrio-crowned Lorikeet).

Locality—New South Wales, Victoria, South and Western Australia.

An egg from a clutch of four taken from the hollow spout of a gum-tree, near Mount Barker, South Australia, 18th September,

1886, by Messrs. A. J. and W. White, is a size larger than that of the Little Lorikeet *(T. pusilla)*, round, and in colour soft white, slightly discoloured with the brownish wood dust of the nesting hollow. Dimensions, 2·05 x 1·8 cm.

I may perhaps mention that the Messrs. White are connections of the late Mr. White, so often mentioned in Gould's work.

At the time of my visit to the Wimmera district, Victoria, October, 1882, I found the Porphyrio-crowned Lorikeet breeding, but was unable myself to procure the eggs.

Once, when on the mail boat steaming down Spencer's Gulf, I was agreeably astonished to see one of those little Lorikeets flutter on board and lodge on the hurricane-deck, where I easily secured it. On holding it up to the admiring passengers the little bird protested by digging its hard bill into my thumb. Throwing the bird into the air, it uttered its characteristic harsh screech, gave its body a quiver, and headed straight for the land.

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., LL.D., F.R.S.

(Continued.)

Styphelia Kingiana.

Branchlets tomentellous; leaves small, ovate-lanceolar, pungent-acuminate or some verging into a more roundish form, somewhat concave but flat at the margin, dull pale-green on both sides, impressedly streaked by 8 thin, almost parallel venules, bluntly keeled; flowers axillary, solitary, rather large; bracts except the lowest as well as the bracteoles and sepals whitish, acuminate; bracteoles broad, nearly half as long as the calyx; corolla slightly exceeding the sepals, to the middle five-cleft, outside pale-yellowish, inside from above the base white-lanuginous; free part of the filaments very short, emerging close to the base of the corolla-lobes; anthers pendent, not much shorter than the corolla-tube, linear-cylindric, reddish, divergently short-bilobed; style elongated, subulate, to above the middle pubescent; stigma very minute; disk greenish, cleft to the middle into five semi-orbicular lobes with a darker zone of colouration; ovulary invested, and surpassed by a dense tuft of white straight hairlets.

Near Lake Deborah; Cronin.

A plant of chaste beauty. Leaves almost sessile, mostly ¼–⅓ inch long. Flowers nealy ⅔ inch long. Corolla-lobes semi-lanceolate-linear. Cells of the ovulary narrow. Fruit unknown. In the only branchlet received the flowers may not be fully developed and the corolla may finally therefore lengthen more

out beyond the calyx, rendering then an expansion of its lobes possible. Only two other species with ciliolar or penicillar surrounding of the ovulary are on record, namely :—*S. cymbiformis* and *S. blepharolepis;* real relationship, however, draws our new congener near *S. rufa*, which likewise is an inhabitant of desert-regions. It bears also some resemblance to *S. xerophylla.*

This floral rarity is dedicated to Henry John King, Esq., who by his genius and zeal has greatly contributed for elevating one of the most brilliant of arts to its high tone in our metropolis.

NOTICE OF A NEW BOOK.

HANDBOOK OF THE DESTRUCTIVE INSECTS OF VICTORIA. Part II. By C. French, F.L.S., Entomologist to the Department of Agriculture, Victoria. Melbourne, 1893. Price 2s. 6d.

IT is with great pleasure we record the publication of the second part of the "Handbook of the Destructive Insects of Victoria," and congratulate the author on the general excellence of the work, and the clear and interesting way the subject matter is placed before those for whom it has been specially written.

The part under notice contains descriptions of twenty noxious insects affecting peaches, plums, cherries, apples, vines, potatoes, cabbages, &c., each accompanied by a coloured plate giving the full life-history, and in many cases also illustrating the natural enemies of the insect described, while the letter-press contains hints as to the best means to be adopted by horticulturists and others to lessen the damage likely to be caused by these pests.

It seems strange that such a comparatively rare insect as the Silver-striped Hawk Moth (*Chœrocampa celerio*) should be included as a destructive insect, but no doubt, as Mr. French remarks, its caterpillar is very voracious, and can do an immense amount of damage to a vine in a very short space of time. We must be content, therefore, in future to regard one of the prizes of a local entomological collection as a noxious insect.

A chapter is devoted to fruit- and grain-eating birds, the insectivorous birds having been dealt with in part i., and a list given of the more destructive of the indigenous birds. An appendix contains drawings of a number of the new appliances for spraying trees and plants.

The plates were drawn from life by Mr. C. C. Brittlebank, and lithographed in colours by Messrs. Sands and M'Dougall, Troedel and Co., or P. A. Ashley, and reflect great credit on all concerned, the delineations in most cases being excellent, both as regards drawing and colouring.

We understand that the edition of 9,000 copies of part i. is

almost exhausted, and we predict there will be considerable demand for the new part, the work being almost indispensable to that largely increasing class in our midst—viz., those dependent for their living upon the produce of the garden or field.

The work will be continued in subsequent parts, the next being already well in hand.

NOTES AND QUERIES.

Effect of Vibration on Ballast.—During a recent geological excursion we were examining the sections displayed in the railway cuttings near here, when my attention was drawn by a student to a little peculiarity I had not previously noticed. The constant vibration produced by the passing of trains over the rails had caused the ballast which covered the ends of most of the sleepers to become as well rounded as if it were composed of waterworn gravel. The dust produced by the grinding covered the stones with a light grey coat, while close beside the sleepers the ordinary dark colour of the basaltic material was shown by the angular fragments of ballast that had not been acted upon.—T. S. Hall, Castlemaine.

Amphibia and Reptilia.—Being engaged on a work on the "Development of the Maternal Instinct," I should be glad if any workers could give me information as to the number of eggs laid by Frogs, Lizards, Snakes, Tortoises, Turtles, &c.—in fact, any of the Amphibia or Reptilia. Information as to birds I have in abundance, also for mammals, though I should like to have further notes on the number of offspring of the Marsupials and Monotremes. Instances of parental care and affection are greatly desired, and for all observations used the name of the observer will be quoted.—Alex. Sutherland, Heronswood, Dromana, Victoria.

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Proceedings of Royal Society of Victoria*," vol. v., new series :—

"Preliminary Notice of Victorian Earthworms," part 2, by Prof. W. Baldwin Spencer, M.A. In this are described and figured 22 (20 new) species of the genus Perichæta.

"Further Notes on the Oviparity of the Larger Victorian Peripatus, generally known as *P. leuckartii*," by A. Dendy, D.Sc., F.L.S.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part V.

Group—GEOMETRINA.

The usual method employed in arranging the Heterocera is to place the *Noctuina* next to the *Bombycina*, but Meyrick (Tr. Ent. Soc., 1892, p. 53 *et seq.*) has shown—and I agree—that the group under notice is closely related to the last-named group, especially the *Notodontidæ*; and when one considers the Bombyciform build of some forms of *Monocteniadæ* the truth of the statement cannot be doubted. Meyrick's observations have not been formed in any hurried manner—I find on investigation that he dissected and examined over 2,000 specimens—and, considering the status he holds in the entomological world, his opinions should be treated with the greatest respect. My own opinion is that it is quite feasible to show the transitional links in any group, but when applied to the whole becomes impracticable. For instance, it requires a stretch of imagination to fill in the gap between the *Saturnidæ* and *Strophidiadæ*. The *Pyralidina*, which Meyrick considers of Bombycoid ancestry, seems to connect or follow the *Noctuina* better than any form of *Geometrina*, especially the group called by Gueneé *Deltoidæ*, species of which at first sight resemble them greatly. I may here mention that the majority of the species herein mentioned are described clearly by Meyrick in Linnean Society's Proceedings of New South Wales, from 1878 to date.

Family—HYDRIOMENIDÆ.

GYMNOSCELIS. Mab.

MESOPTILA. Meyr.

CHLOROCLYSTIS. Hb.

151. C. FILATA, Gn. (*Eupithecia filata*, Gn., x., 353; *Phibalapteryx rubroferrata*, Walk., 1,341; *Pasiphila filata*, Meyr., Proc. Linn. Soc. N.S.W., 795, 1890).

Melbourne.

PHRISSOGONUS. Butl.

*152. P. DENOTATUS, Walk. (*Scotosia denotata*, Walk., 1,361; *Phibalapteryx parvulata*, *ib.*, 1,721; *Phrixogonus denotatus*, Meyr., Tr. N. Z. Inst., 1887, 53; (?) *Eupithecia testulata*, Gn., x., 352; *Phrissogonus denotatus*, Meyr., Proc. Linn. Soc. N.S.W., 798, 1890).

Gisborne, Melbourne, &c.

Varies in size and colour of markings.

153. P. INSIGILLATUS, Walk. (*Eupithecia insigillata*, Walk., 1,245; *Phrissogonus insigillatus*, Meyr., Proc. Linn. Soc. N.S.W., 799, 1890).
Melbourne, Gisborne, &c.

154. P. PYRETODES, Meyr. (Proc. Linn. Soc. N.S.W., 799, 1890).
Melbourne.

155. P. LATICOSTATUS, Walk. (*Larentia laticostata*, Walk., 1,196; *Scotosia canata*, *ib.*, 1,357; Butl., Ann. Mag. N. H., 1882, 94; *Phrissogonus laticostatus*, Meyr., Proc. Linn. Soc. N.S.W., 801, 1890).
Gisborne, Warragul, Melbourne, &c.

MICRODES. Gn.

156. M. VILLOSATA, Gn. (x., 297, pl. xv., 8; *Panagra mixtaria*, Walk., 1,663; *Microdes toriata*, Feld., pl. cxxxi., 34).
Melbourne, Casterton, Gisborne.

157. M. SQUAMULATA, Gn. (x., 298; Meyr., Proc. Linn. Soc. N.S.W., 803, 1890).
Melbourne, Gisborne.

REMODES. Gn.

LOBOPHORA. Curt.

HETEROCHASTA. Meyr.

POLYCLYSTA. Gn.

PROTAULACA. Meyr.

EUCHŒCA. Hb.

158. E. RUBROPUNCTARIA, Dbld. (*Ptychopoda rubropunctaria*, Dbld., Dieff., N.Z., ii., 287; *Acidalia pulchraria*, Walk., 780 (*nec* Dbld.); *Asthena risata*, Gn., ix, 438; *A. mullata*, *ib.*, Ent. Mo. Mag., v., 42; *A. rubropunctaria*, Meyr., Tr. N.Z. Inst., 1883, 60; *Euchœca rubropunctaria*, Meyr. Proc. Linn. Soc. N.S.W., 811, 1890).
Melbourne, Fernshaw, Gisborne, &c.
I believe *Asthena vexata*, Walk., is an additional synonym, but cannot find reference.

ASTHENA. Hb.

*159. A. PULCHRARIA, Dbld. (*Acidalia pulchraria*, Dbld., Dieff., N.Z., ii., 286; *Asthena ordinata*, Gn., ix., 438, pl. xix., 4; *Chlorochroma plurilineata*, Walk., 563; *Asthena pulchraria*, Meyr., Tr. N.Z. Inst., 1883, 69; Proc. Linn. Soc. N.S.W., 813, 1890).
Melbourne.

*160. A. XYLOCYMA, Meyr. (Proc. Linn. Soc. N.S.W., 814, 1890). Melbourne.

161. A. PELLUCIDA, Lucas (Proc. Linn. Soc. N.S.W., 253, 1892). Fernshaw.

SCORDYLIA. Gn.

162. S. OXYNTIS, Meyr. (Proc. Linn. Soc. N.S.W., 817, 1890). Melbourne.

163. S. LEUCOPHRAGMA, Meyr. (*loc. cit.*, 818, 1890). Melbourne.

164 S. TRISTIS, Butl. (*Phytometra tristis*, Butl., Ann. Mag. N. H., 90, 1882).
Melbourne.

HYDRIOMENA. Hb.

*165. H. INTERRUPTATA, Gn. (*Cidaria interruptata*, Gn. x., 469, pl. ix., 6; *Hydriomena interruptata*, Meyr., Proc. Linn. Soc. N.S.W., 825, 1890).
Gisborne, Melbourne.

166. H. LUCIDULATA, Walk. (*Cidaria lucidulata*, Walk., 1,407; *Hydriomena lucidulata*, Meyr., Proc. Linn. Soc. N.S.W., 827, 1890).
Gisborne, Melbourne.

167. H. CONIFASCIATA, Butl. (*Chrysolarentia conifasciata*, Butl., Ann. Mag. N. H., 1882, 93; *Hydriomena conifasciata*, Meyr., Proc. Linn. Soc. N.S.W., 828, 1890).
Melbourne, Gisborne.

*168. H. SUBRECTARIA, Gn. (*Coremia subrectaria*, Gn. x., 411; *Cidaria responsata*, Walk., 1,409; *Melanthia casta*, Butl., Cist. Ent., ii., 553; *Hydriomena subrectaria*, Meyr., Proc. Linn. Soc. N.S.W., 829, 1890).
Melbourne.

169. H. ANTHRACINATA, Gn. (*Camptogramma anthracinata*, Gn., x., 425, pl. vii., 5; *Melanodes atriplina*, Walk., 324; *Hydriomena anthracinata*, Meyr., Proc. Linn. Soc. N.S.W., 830, 1890).
Gisborne, Melbourne, Warragul, Mount Macedon, &c.

170. H. STRUMOSATA, Gn. (*Coremia strumosata*, Gn., x., 419; (?) *C. excentrata*, *ib.*, 419; (?) *C. quartanata*, *ib.*, 419; *C. solutata*, Walk., 1,319; *Cidaria intentata*, *ib.*, 1,406; *C. solitata*, *ib.*, 1,409; *Hydriomena strumosata*, Meyr., Proc. Linn. Soc. N.S.W., 831, 1890).

171. H. LAMPROTIS, Meyr. (Proc. Linn. Soc. N.S.W., 832, 1890).
Gisborne, Melbourne, &c.

*172. H. CONSTIPATA, Walk. (*Cidaria constipata*, Walk., 1,405; *C. bifusata*, *ib.*, 1,406; *Hydriomena constipata*, Meyr., Proc. Linn. Soc. N.S.W., 834, 1890).
Gisborne, Melbourne.

173. H. HETEROLEUCA, Meyr. (Proc. Linn. Soc., N.S.W., 837, 1890).
Gisborne, Warragul, Melbourne.

*174. H. IMPERVIATA, Walk. (*Larentia imperviata*, Walk., 1,196; *Hydriomena imperviata*, Meyr., Proc. Linn Soc. N.S.W., 837, 1890).
Gisborne.

175. H. LANGUESCENS, Ros. (*Coremia languescens*, Ros., Ann. Mag. N. H., 1885, 433, pl. xi., 8; *Hydriomena languescens*, Meyr., Proc. Linn. Soc. N.S.W., 839, 1890).
Melbourne, Gisborne.

*176. H. GYPSOMELA, Lower (Tr. Roy. Soc. S.A., 11, 1892).
Melbourne.

*177. H. MICROCYMA, Meyr. (Proc. Linn. Soc. N.S.W., 840, 1890).
Gisborne.

178. H. MECYNATA, Gn. (*Camptogramma mecynata*, Gn., x., 424; *C. extraneata*, Walk., 1,717; *C. annuliferata*, *ib.*, 1,717; *Hydriomena mecynata*, Meyr., Proc. Linn. Soc. N.S.W., 845, 1890).
Gisborne, Melbourne, &c.

179. H. PERORNATA, Walk. (*Lythria perornata*, Walk., 1,056; *Hydriomena perornata*, Meyr., Proc. Linn. Soc. N.S.W., 844, 1890).
Melbourne, Springvale.

180. H. LEUCOZONA, Meyr. (Proc. Linn. Soc. N.S.W., 846, 1890).
Ballarat, Mount Macedon, Gisborne, &c.

181. H. CORRELATA, Walk. (*Camptogramma correlata*, Walk., 1,330; *Hydriomena correlata*, Meyr., Proc. Linn. Soc. N.S.W., 848, 1890).
Melbourne.
I think this and the following will ultimately prove the same.

*182. H. EBULEATA, Gn. (*Camptogramma ebuleata*, Gn., x., 424; *Cidaria fervidata*, Walk., 1,408; *Hydriomena ebuleata*, Meyr., Proc. Linn. Soc, N.S.W., 849, 1890).
Melbourne.

Field Naturalists' Club of Victoria.

President:

MR. H. T. TISDALL, F.L.S.

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The Victorian Naturalist:

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— OF —

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The Author of each article is responsible for the facts and opinions he records.

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THE

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FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday evening, 11th September. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and there was an attendance of some 60 members and friends.

LIBRARIAN'S REPORT.

The hon. librarian reported the following additions to the library :—"Annals of the Queensland Museum," No. 1, from Trustees; "Report of Trustees of Australian Museum for 1892," from Trustees; "Modern Microscopy," by M. T. Cross and M. J. Cole, from Messrs. W. Watson and Sons; "Hymenoptera from the Elder Expedition," by W. W. Froggatt, from the author; "On the Life-Histories of Australian Coleoptera," by W. W. Froggatt, from the author; "On the Nest and Eggs of *Gerygone nagnirostris* (Gould)," by A. J. North, F.L.S., from the author; "Report of Australian Association for Advancement of Science," Hobart, 1892, from the Association; "Proceedings of the Academy of Natural Sciences, Philadelphia," from Society; "Proceedings of the Royal Society of Queensland," vol. ix., from Society; "Journal of Pharmacy," from Society; "Smithsonian Report, U.S. Museum, 1890," from Smithsonian Institute.

MEETING FOR PRACTICAL WORK.

A report was received from the Rev. W. Fielder, who had charge of the meeting for practical work on 28th August, when a second demonstration was given on the dissection of the leech. Some fifteen members took part in the work of actual dissection. Transverse sections of the leech had been prepared (together with explanatory diagrams) by Mr. A. G. Fryett, and these were distributed to those present for examination by aid of the microscope. An idea of the general relationship of the various organs and structure of the body was thus clearly demonstrated, and drawings made from these specimens helped to fix the details clearly in the mind of those engaged in the work. The anatomy of the garden snail will be the subject for the next few meetings.

EXCURSION REPORT.

Mr. C. French, F.L.S., reported the results of a successful excursion of the Club to Cheltenham on Saturday, 19th August, botanical and entomological specimens being chiefly collected; and a sub-report by Mr. J. A. Shephard recorded some interest-

ing forms of pond life—a species of Rotifer of the genus Anuræa being deemed worthy of precise description.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. J. Bennett, S. Masters, and E. P. Moncrieff were duly elected members of the Club.

PAPER READ.

By Miss L. J. Little, B.Sc., entitled "Barriers to Migration, and their Effects as shown in the Animals and Plants of the Australian Region."

The general principles underlying the distribution of animals were briefly discussed, and their application to the fauna and flora of the Australian region dwelt upon at some length. As the subject was illustrated by maps it was followed with great interest by those present.

NATURAL HISTORY NOTES.

Mr. J. Gabriel reported that whilst in company with G. A. Keartland, on Saturday, 9th September, on the Werribee Plains, he found some four or five nests of the Crow (*Corvus australis*), and attached to them were nests of the Geobasileus (*chrysorrhœa*) in full working order. The nests above were tenanted by the Crows, which also gave evidence of their usual activity.

Mr. T. S. Hart, M.A., exhibited a specimen showing "doubling" in *Correa speciosa* collected by him near Riddell's Creek, 17th August, and pronounced by Baron von Mueller to be the first case recorded in Correa. In connection with this exhibit, the following list of anomalies was put in by Mr. Hart, and may be of interest to members:—*Billardiera scandens* with sepals elongated and similar to petals and an additional ring of petals, Sandringham; *Diplarrhena morœa* with four sepals and four petals, Darlimurla, Gippsland, November, 1890; *Caladenia congesta*, a small variety, which Baron von Mueller says he had not before seen, Heatherton; *Comesperma calymega*, white and pink varieties, Frankston; *Comesperma ericimum*, white, Darlimurla.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. C. French, F.L.S.—New Australian Coleoptera—*Dysectoda Digglesii*, *Dilochrosis atripennis*, *Schizorrhina Mastersii*, *S. emilia*, *Cetonia fulgens*, *C. tibialis*. By Mr. C. French, jun.—Fern, *Botrychium ternatum*, from Dandenong. By Mr. R. Hall.—The four Australian members of genus Sula—viz., *piscator*, *fiber*, *cyanops*, *australis*. By Mr. T. S. Hart, M.A.—*Correa speciosa* (double flower), from ranges north of Riddell's Creek, 17th August, 1893. By Mr. G. F. Hill.—11 species of beetles hatched since last meeting; also, nest of the Little Grass Bird, containing

three eggs, taken at the Club's excursion to Cheltenham. By Mr. G. F. Hill.—Life-history of moth *Teia anartoides*, with colony of young larvæ, killed by small ichneumon fly, from Cheltenham; also, life-history of moth *Oncoptera intricata*, with parasitic fungus growth on larvæ, from Windsor, probably new to science. By Baron von Mueller.—Flowering specimens of the Sandalwood Tree of New Guinea, procured at his wish by Sir William Macgregor, to whom this Papuan species has been dedicated. It seems, however, very closely related to the New Caledonian Sandal Tree (*Santalum Homei*), the phytographic characteristics of which are as yet imperfectly known. In many respects it approaches also *Santalum Freycinetianum*, from the Hawaiian Islands. *Alphitonia excelsa*, from Bloomfield River, Queensland, said to cause the death of *Dendrolagos Lumholtzii* when used as fodder; *Styphelia Kingiana*, from Lake Deborah, W.A., collected by Mr. Cronin, new to science; also, "Herbarium Analiticum," by M. Buysman, of Middelburg, Holland, illustrative of medicinal plants. By Mr. J. Shephard.—Some forms of Rotifera. By Mr. H. T. Tisdall, F.L.S.—Fungus *Puccinia wurmbeæ*, found by J. Pickering, Esq., at Great Western, Victoria, 7th August, 1893. Dr. Cooke describes this fungus thus:—"Sori elongated, bullate, dark brown; uredospores elliptic granulate, brown; teleutospores clavate, uniseptate, slightly constricted at the middle; upper cell convex or truncate, darker; lower cell angular, attenuated downwards into the short, hyaline pedicels; epispore even.

After the usual *conversazione* the meeting terminated.

Mr. M. Buysman, of Middelburg, Holland, has commenced to issue superb sets of dried medicinal plants. Each specimen is most exquisitely spread out, so that the internal structure of the flowers can be seen at a glance. By a careful process of exsiccation the colour of leaves and blossoms is well kept. What renders this collection quite novel in its way is the use of flattened glass tubes, purposely prepared, into which delicate portions of flowers and fruits are put, preserved in alcohol, these small glass vessels being enclosed in paper capsules along with others containing seeds or small fruit of the respective specimens. Baron von Mueller has received, as a donation from the author, the first set, numbering about 70 species, and it is his intention to contribute to this valuable series from here. He recommends this incomparable collection for purchase, particularly by medical and pharmaceutical students, and also by teachers of Botany, for their respective uses, the expenditure being much less than that necessary for the expensive works on medicinal plants, and, moreover, natural samples being always the best for research—Linnæus already having contended "Herbarium praestat omni iconi."

EXCURSION TO CHELTENHAM.

THE first outing on the new annual list of excursions of the Field Naturalists' Club took place on Saturday, 19th August, the place chosen being Cheltenham, a township about twelve miles south of Melbourne, on the Mordialloc and Frankston railway. The day was fairly fine, but windy. The first to put in an appearance at Prince's Bridge station was the leader, Mr. C. French, sen., who was shortly after joined by Mr. Best. The platform, owing to a race meeting at Caulfield, was densely crowded with people, and as we could not detect any of our members in the crowd, we were afraid that the threatening weather had prevented them from turning up. We (Mr. Best and myself), however, resolved to go on and do a little hunting on our own account, but on arrival at Cheltenham were very pleased to see a goodly muster of members—fourteen in number, including our president and four ladies. The route chosen was through the local cemetery, and in this secluded and pretty spot we found many specimens of the new and singular coccids, *Cylindiroccus casuarinæ* and *Lecanium Frenchii*, these having been found by myself for the first time, and described by Mr. Maskell, of New Zealand. Steering our course westward over the sandy hills, we came across the pretty little plants *Hovea heterophylla* and *Euphrasia Brownii*, both of which in the early days were very common in these parts, but are now becoming somewhat scarce. Arriving at the "Old Springs" our "pond life" people set to work with a will. (A brief account of what they did on the occasion has kindly been forwarded to me by Mr. Shephard, and is appended to this report.) The so-called "Old Springs" was once a charming little spot, the banks being thickly clothed with small plants of that elegant fern *Gleichenia circinata*, commonly known as the Coral Fern. The place is now changed, and the once clear hole of water has been fenced, a pump erected, without (it appeared to us) a due regard for the health and welfare of the good people of Cheltenham, whose supply of water is mostly derived from this source. In 1853–4 this water was beautifully clear and wholesome; but, now that the fence is broken down, dogs and other domestic animals can bathe in this spring with impunity. Pushing on towards Sandringham we pass several well-known spots, reminding one, at least, of the party of pleasant times in the early fifties. The lovely Epacris, together with Styphelia, Sprengelia, &c., were at their best. The strong perfume from *Acacia suaveolens* was noticeable in many places where we passed through. Larvæ seemed scarce, but several were taken, and on the stem of a common "bog-shrub," *Viminaria denudata*, a fine male specimen of the beautiful moth *Danima banksia* was found clinging. This is, I think, an unusual place to find the perfect insect, although the larvæ are common enough on small plants of *Banksia*

australis, or dwarf scrub Honeysuckle. Of boring larvæ we found many, and these were brought home by the Masters Hill for rearing purposes. The so-called "New Springs" are about half a mile west of the "Old Springs," and were first opened out for cattle in 1855. In these springs there are many aquatic plants, as :—Chara, Myriophyllum, Ottelia, besides many species of Confervæ, &c. Beetles were scarce, and very few species were found, and of Lepidoptera six or seven kinds were collected, together with larvæ of Entometa, Metura, Clenia, &c., &c.—about ten (10) species in all. As the afternoon was short, and some of the party having to catch the train back to Melbourne, we faced towards the station, and on our way flushed the Little Grass Bird, with a nest of three eggs, the latter being brought home for the collection. Mr. Hart having elected to walk to Brighton, found, as we afterwards learned, a Copperhead Snake. Orchids were scarce, it being too early for most kinds. Plants in flower were fairly numerous, and in this connection it may be interesting to learn that at Sandringham a wild flower show was being held, but our time was too short to permit of our party honouring the show with their patronage. Melbourne was reached about dark, and all agreed that a pleasant and fairly profitable afternoon had been spent. It is very gratifying to be able to report such a good attendance of members, which it is hoped will continue to be the case during the season, as field work was one of the principal objects for which our club was started.

Mr. J. Shephard remarks that "two members were drawn by Mr. French's promise to conduct them to the 'Springs,' and found them quite an ideal place for their purpose. The first one visited is used as a local water supply, and is in the form of a circular bricked tank. Through the interstices in the brickwork Myriophyllum and other water plants projected into the water, and on them were subsequently found Rotifers of the genera Limnias and Eocistes. As is often the case in deep, permanent water, free swimming forms were not numerous. The next spring is in a natural condition, and is a charming little pool, with clear water, and filled with a luxuriant growth of Conferva and the higher aquatic plants. The overflow at this season forms a large, shallow pool, and in this Volvox was at once seen. Later examination of the material did not yield a lengthy list, as at the outset a puzzling Rotifer of the genius Anuræa was met with. This genus is composed of small loricate species, and there are quite a number of Australian forms which do not agree with any published descriptions. The one in question has a shield-shaped lorica, prolonged in front into six spines and posteriorly into one central spine. The lorica possesses characteristics intermediate between the British form *Anuræa cochlearis* and *A. stipitata* (Ehrenberg), but there is a central prominence on the corona not shown in the

figure of *A. cochlearis*. The only figure of *A. stipitata* available was of the lorica only, which agreed in general outline and number of spines, but differed in the arrangement of the tesselated markings. Among other life noted were a number of very young forms of Lepidurus. It was felt that these springs would well repay the trouble of an occasional visit at different seasons of the year, and the members present were indebted to Mr. C. French for his thoughtfulness in including these pools in his route, and also for his interesting explanation of the scale insects and other plant parasites met with on the way."—C. French, F.L.S.

ON A SPECIES OF ISARIA.

By H. T. Tisdall, F.L.S.

(Read before the Field Naturalists' Club of Victoria, 10th July, 1893.)

We are all aware that animals for the most part prey on the vegetable world, and on its destruction and subsequent absorption animals live and thrive; but it is not so well known that some species of the vegetable world return the compliment.

A number of fungi are entirely dependent for existence on the nourishment which they obtain from the animal creation. Amongst these parasites those that prey on various kinds of insects are not the least curious.

The three best known groups of these plants are Entomophthoreæ, Laboulbeniaceæ, and Cordyceps. The Entomophthoreæ form a species of innate absorption moulds—they absorb and replace the internal organs of the insect, and only appear on the surface when they have killed their hosts. These fungi are very minute. The most common and familiar example will be found on the dead flies on the window pane. White bundles may be observed exuding from different parts of the body of the fly; these are, in the first instance, produced from a cylindrical germ cell, which continuously grows in an apical direction, finally developing into a branched body of cylindrical thread-like form, termed a hypha. These hyphæ, when first developed in the insect, are of different sizes and shapes, constantly increasing in number by budding until the body of the insect is almost completely filled by them. If the insect be now exposed during moist weather, long threads are produced from the hyphal bodies; these protrude through the joints of the insect, and either appear as simple white hairs or become fruitful, the tips of the branches swelling and producing gonidia. When the swollen ends are quite mature the mother cell is ruptured, and the conidium or spore is forcibly ejected to a considerable distance. The hyphæ have accomplished their work of destruction before they appear on the surface of the fly. Mr. Gray gives the following graphic description:—"All these

insects may occasionally be seen, after autumnal rains, dead on the bark of trees, or portions of various plants, on the ceilings and windows of houses, &c., adhering by means of a whitish fungoid matter, or mould, which seems to have emerged from between the last segments of the abdomen beneath and the joints of the legs. The body and wings also become entirely covered by the same parasite, which, under a high magnifying power, appears to consist of elongated filaments in close contact. When separated from the mass, some are found simple and others terminated by a minute globule; those upon the wings appear merely globules. These flies, which are in the perfect state, become, while in activity, suddenly overtaken by the effect of the parasite internally, which causes the insect to settle on any object that may be in its way. Death soon after ensues; and the rapid growth of the parasite having first affixed them by the abdomen and legs to the object on which they had rested, it then develops itself entirely on the outer surface of the insect, and even spreads itself for some distance around it, as may easily be noticed in those seen on windows." Professor Cooke relates the following: —"In the spring of 1884, from the middle of May until the end of the first week in June, all the gardens and fields in the neighbourhood of Ottawa were severely attacked by the larvæ of *Agrotis fennica*. The disease pervading these larvæ was extremely virulent. Dead larvæ were to be found in all directions —on stone walls, on fences, and particularly on the tops of the stems of grasses. The Entomophthora was undoubtedly the influence which brought this destructive insect down again to its normal rare occurrence at Ottawa."

The fungus in this instance was *E. virescens*. He describes its appearance as a greenish yellow coating, emerging in small tufts from the body of the insect. The gonidia were oval or oblong with a bluntly rounded base and apex; colour greenish yellow.

Turning our attention to the Laboulbeniaceæ we find that they can be hardly termed true parsaties, as none of their roots, or hyphæ, have been observed to penetrate the cuticle of their host. Dr. Cooke thus describes them:—"They are often found on Coleoptera, adhering to the legs, elytra, and body of the insect. They have no mycelium penetrating the beetle, but are entirely superficial, being attached by a small obconical knob at the base of the stem; hence they may be carried about by the insect for an indefinite period of time. Their colour is mostly some tint of brown, and their form more or less clavate (club-shaped). The upper portion is occupied by the perithecium, the cavity in which the spores are produced, and these escape by a perforation at the apex. The lower portion is narrowed into a stem, which has two cells, one above the other,

at the base, and above this several cells support the spore cavity. The sporidia are mostly spindle shaped, divided in the middle, at first contained in asci, which speedily disappear. Beside the upper portion of the club, and near the base of the perithecium, is usually a projection on one side with thread-like processes proceeding from the apex, called pseudoparaphysis."

The Laboulbeniaceæ are found mostly on Coleoptera. Mr. French says that the following genera are indigenous to Victoria, and as these fungi have been found on them elsewhere I append a short list, trusting that some of our members will carefully examine any beetles of these genera that may come in their way, to see whether some of these minute fungi may be attached to them, viz. :— Anchomenus, Bembidium, Bledius, Chlœnius, Harpalus, Laccophilus, Casnoria, Pœderus, Platynus.

The first entomophyte noticed from Australia was the *Cordyceps Taylori*, which was found at the Murrumbidgee River, in 1837, by Mr. Allan. The following description of this curious plant is given by the Rev. M. J. Berkeley :—"Springing from the head of an extremely large caterpillar, about six stems grow from the same point, forming a complete cylindrical mass two and a half inches long, three-quarters of an inch thick, connate, slightly branched and anastomising ; expanded slightly upwards and giving off a branch of short, much compressed, forked and palmate branches, which are dotted above with the perithecia. The apices are somewhat pointed. The colour of the whole is a deep red brown, inclining to tawny when dry. The whole of the branches are clothed with a very thin coat of extremely short irregular flocci, which give the surface a dull appearance when dry. They are at first solid, but at length become hollow."

A portion of the caterpillar is filled with a white corky substance, for the root is more or less coated with a spongy mass, consisting of very slightly branched wavy threads. Dr. Joseph Hooker, speaking of this fungus, says :—" This fungus was picked up on the banks of the Murrumbidgee River, ten miles from the township of Yass, in a rich, thick alluvial soil, with many others of the same kind. When fresh it was eight inches long, and three inches of the fungus from the nape of the neck were buried underground, on the surface of which is the oval or circular flower-like bunch of branches, of a brown velvety appearance when fresh. The caterpillar has a great resemblance to the green wattle caterpillar which produces a large brown moth."

Since the discovery of this Cordyceps by Mr. Allen a number of other species of the same family have been found. Dr. Cooke, in his large work on Australian Fungi, describes several species of Cordyceps found in Victoria. Amongst these the most pertinent to our subject is *Cordyceps Gunnii.* The species was first discovered in Tasmania by Mr. Gunn, who gives the following description of

it :—" The stem with caterpillar attached is from five to eighteen inches long, rarely branched, flexious, rugged below, cylindrical, solid, white, collecting particles of sand by means of a few downy threads. The head is from two to three inches long, one-third to one-quarter of an inch thick, perfectly cylindrical or lanceolate, obtuse or a little acute at the apex, sometimes compressed, yellow below, with the top of the stem becoming black above. The mouths of the perithecia scarcely projecting ; sporidia breaking up into truncate (almost quadrate) joints." The specimen which I have drawn was found by Mr. C. French in Studley Park, near the River Yarra, and the dried specimen is now to be seen in the Botanic Museum, Melbourne. It differs from most specimens in one important particular. Generally the fungus is continued in a line with the body, whereas in the one figured it rises at right angles from the caterpillar, springing from the nape of the neck. Like all Cordyceps it has a long stipe surmounted by a black cylindrical head tapering slightly at the apex and bases. The section of the head shows the perithecia placed side by side immediately below the surface. I condense the following description of a very common British species of Cordyceps from De Bary's " Morphology of Fungi " :—" *Cordyceps militaris.*—Ascospores (spores contained in asci), formed in the orange-coloured, club-shaped stromata, are ejected as rod-shaped bodies, divided by transverse walls. When these rod-shaped cells fall on the moist body of the caterpillar they usually separate from one another, become rounded in shape, and then put out germ tubes. The germ tubes penetrate at once into the chitinous skin of the insect. Here they enlarge and make their way between the bundles of muscles and lobes of fatty substance of the creature. By means of terminal or lateral sprouting they give off spore cells, termed gonidia. These gonidia are disseminated through the blood by the movements of the insect, and fill it by degrees into a dense mass. They grow at the expense of the blood, which diminishes in quantity to such a degree that the insect becomes soft, and in this state dies. A body is thus formed in two to three days' time which retains the shape of the living insect, but consists of a close weft of fungal hyphæ, with some small remains of the body of the insect." In the foregoing description we have a parasitic fungus bearing spores in asci, growing at the expense of a living insect. But now from the fungal hyphæ contained in the remains of the insect a new form of fungus arises ; it passes out through the skin of the caterpillar and appears on the surface as club-shaped fungus bodies borne on orange-coloured stalks, with a felt of branchlets covered with gonidia, which are really naked spores. This new fungus is a form species known under the name of *Isaria farinosa.* Both of the famous French savants, De Bary and Tulasne, agree that *Isaria farinosa* must be regarded as a gonidial state of

Cordyceps militaris, and they seem to think that all the species of Isaria are in the same way connected with, and derived from, some species of Cordyceps.

The curious species of Isaria which I wish to bring before you this evening was discovered by one of our members, Mr. H. Giles, of Nar-Nar-Goon. I do not think I can do better than give his notes on the finding of the fungus in nearly his own words—"I found it on 6th April, 1893, under a piece of charred timber about six or seven inches long and four inches wide. The timber was lying amongst some tufts of kangaroo grass and rushes, in heavy timbered land belonging to Messrs. Joske and Best, at Gembrook. When found the fungus was growing prostrate, spreading from the cocoon over the charred timber, which was declined at an angle of about 45 degrees. It was just beginning to attach itself to the wood where the thickened parts begin. Perhaps I should state that the wood was not from a recent fire by any means; I should say that it had been burnt for at least three, perhaps five, years. When I obtained it there was nothing of the fungus visible except that growing from the sides of the cocoon, but in a short time it began to burst through the top, or rather the bottom, for the cocoon was firmly fixed to the under side of the charred wood. During the time I had the specimen the branches of the fungus had increased in length by two or three lines, for I had been careful to keep the cork on which I had placed it moist and cool."

When I received the specimen from Mr. French it was carefully spread over the cork false bottom of the box in which it had been forwarded. The cocoon was in the centre, and from it were three groups of fungoid branches. The first group consisted of about ten distinct stems, some of them partly fastened together; they sprang from the under side of the cocoon and spread outwards; most of them had a distinct cylindrical slender stem about 15 lines long by ½ line in width near the base, which sometimes increases in diameter as it grows upwards. Each stem was surmounted by a club-shaped head.

The heads varied in size from 2 lines in length and one line in width up to 3 lines by 1½. The portion of each head next the cork was flattened, rather rough, with small portions of charcoal firmly fastened to it; the rest of the head was nearly semi-spherical, white and rough-looking, covered with a mealy-looking substance. The other two groups of fungoid branches sprang from the opposite side, but in different directions; they also grew from underneath the cocoon, in one group; the stems were inclined to branch, each branch swelling into a distinct head. One group had five principal stems and several smaller ones; the third group had also five stems, some with branches and others slightly anastomising. On making sections of one of the swollen heads

of the fungus, and observing them carefully under different powers of the microscope, I obtained the following results :— Under the 1-inch objective the section appeared to have three distinct layers, the lowest layer consisting entirely of anastomising hyphæ, which had firmly fastened themselves to and penetrated into the interstices of the small portions of charcoal which still adhered to the fungus. These hyphæ grew upwards into the second layer, which was much denser. The denseness was occasioned partly by the hyphæ having begun to sprout and give off sporophores, and partly by the hyphæ having interwoven into a more compact mass. The upper is very different from the lower and middle layers ; the hyphæ are hardly seen, but the whole layer is apparently composed of large rough-looking cells. When a few of these cells were placed under a $\frac{1}{6}$-inch power it was quite evident that they were not single cells, but what De Bary calls compound sporophores. They greatly resemble in appearance a bunch of wattle blossoms, each apparent blossom springing in a sessile manner, sometimes from the end, sometimes from the joint of one of the hyphæ. Under a $\frac{1}{9}$-inch power their structure is more visible, but still rather confused. However, De Bary thus describes the construction of a compound sporophore, and it exactly tallies with the appearance of one of these as seen under a high power :—"The first sprout cell puts out one new protuberance from the apex which is remote from the sporophore and new cell, and each succeeding one can do the same ; a row of cells is thus formed in which the members are successively younger as the apex is approached." Now this is almost exactly what is seen of one of these tufts under the $\frac{1}{9}$-inch power. The end or joint of one of the hyphæ produces a number of sterigmata (neck cells) from the same point, and each of these produce in the manner just described, thus forming a number of rows of cells radiating from the same point. The cells are so exceedingly minute that their construction could not be determined even under this high power.

On cutting the cocoon in two the remains of the insect were seen filling about one-third of the cocoon, whilst from it grew a quantity of the white anastomising hyphæ; the greater number of these had passed through the part of the cocoon nearest to the charred wood, whilst a few had grown upward to the part furthest from the wood. On emerging through the skin of the cocoon the hyphæ matted together into solid stems (as before described), finally bulging into the clavate or club-shaped bodies, a section of which we have been studying. The stem of the fungus being sectioned and submitted to the microscope showed no trace of gonidiaphores, but was found to be entirely composed of hyphæ, anastomising and interlacing so closely as to form a solid stem.

Mr. C. French, F.L.S., judges that the cocoon is that of the moth *Darala ocellata*, which is common around Melbourne.

The specimens from which I have made the drawings were lent to me by Mr. G. F. Hill, who caught them near Armadale. In conclusion I would like to say that I am largely indebted to the excellent works of De Bary and Dr. Cooke for most of the information concerning these little known parasitic fungi.

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Proceedings of Royal Society of Victoria*," vol. v., new series :—

"Nest and Egg of Queen Victoria's Rifle Bird," by D. Le Souëf. Is accompanied by a coloured plate of nest and egg described by Mr. A. J. Campbell, F.L.S., in *Victorian Naturalist*, vol. viii., p. 134.

"Notes on the Lilydale Limestone," by Rev. A. W. Creswell, M.A. Enumerates and describes several new fossils, principally Mollusca, with figures of eight species.

"Preliminary Account of the Glacial Deposits of Bacchus Marsh," by G. Officer, B.Sc., and L. Balfour. Describes the position of the deposits, and advances theories for their origin.

"Synopsis of the Australian Calcarea Heterocœla, with a Proposed Classification of the Group, and Descriptions of New Genera and Species," by A. Dendy, D.Sc., F.L.S. Enumerates 78 species (17 new, principally Victorian, obtained at Port Phillip Heads by Mr. J. Bracebridge Wilson, M.A., F.L.S.), under 20 genera (4 new) and 5 families.

"On two New Tertiary Stylasterids," by T. S. Hall, M.A. Describes and figures two new fossil Hydrozoa, from Geelong.

"Notes on the Mode of Reproduction of *Geonomertes australiensis*," by A. Dendy, D.Sc., F.L.S. Continues the observations on the Land Nemertine described in "*Proc. Roy. Soc. Vict.*," iv., N. S., p. 85.

"The Bluff at Barwon Heads," by G. S. Griffiths, F.G.S. Gives a geological description, with sketches, of this well-known bluff.

"The Lichens of Victoria," part 1, by Rev. F. R. M. Wilson. Gives an introduction, &c., to the Class Lichenes, Micheli, and enumerates 76 species (33 described as new), belonging to 15 genera and 3 families (Collemacei, Myriangiacei, and Lichenacei), besides several forms and varieties of individual species.

"On a New Species of Leucosolenia from Port Phillip Heads." By A. Dendy, D.Sc., F.L.S. Describes a new sponge collected by Mr. J. Bracebridge Wilson, M.A., F.L.S.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part VI.

*183. H. UNCINATA, Gn. (*Camptogramma uncinata*, Gn., x., 424; *Panagra approximata*, Walk., 1,002; *P. plurilineata*, *ib.*, 1,011; *P. intercalata*, *ib.*, 1,012; *Camptogramma replicata*, *ib.*, 1,330; *Panagra revulsaria*, *ib*, 1,665; *Cidaria gallinata*, Feld., Reis. Nov., pl. cxxxi., 8; *Hydriomena uncinata*, Meyr., Proc. Linn. Soc. N.S.W., 850, 1890).

Melbourne, Gisborne, &c.

184. H. SUBOCHRARIA, Dbld. (*Aspilates subochraria*, Dbld., Dieff., N.Z., ii., 285; Meyr., Tr. N.Z. Inst., 1883, 73 (*Arsinoe*); *Camptogramma strangulata*, Gn., x., 423; *Aspilates euboliaria*, Walk., 1,684; *Camptogramma fuscinata*, Gn., Ent. Mo. Mag., v., 92; *Hydriomena subochraria*, Meyr., Proc. Linn. Soc. N.S.W., 851, 1890).

Melbourne, Gisborne, &c.

*185. H. CRYEROPA Meyr. (Proc. Linn. Soc. N.S.W., 853, 1890).

Melbourne.

186. H. MORTUATA, Gn. (*Camptogramma mortuata*, Gn., x., 428; *Cidaria clandestinata*, Walk., 1,408; *Hydriomena mortuata*, Meyr., Proc. Linn. Soc. N.S.W., 853, 1890).

Melbourne, Gisborne, Oakleigh.

*187. H. SEVERATA, Gn. (*Camptogramma severata*, Gn., x., 428; *Phibalapteryx perfectata*, Walk., 1,341; *Scotosia scitiferata*, *ib.*, 1,357; *Cidaria promptata*, *ib.*, 1,410; *Hydriomena severata*, Meyr., Proc. Linn. Soc. N.S.W., 854, 1890).

Melbourne.

MELITULIAS. Meyr.

*188. M. GRAPHICATA, Walk. (*Tephrina graphicata*, Walk., 967; *Melitulias graphicata*, Meyr., Proc. Linn. Soc. N.S.W., 857, 1890).

Melbourne.

189. M. GLANDULATA, Gn. (*Phibalapteryx glandulata*, Gn., x., 439, pl. x., 6; *Eubolia undulata*, Ros., Ann. Mag. N. H., 1885, 432; *Melitulias glandulata*, Meyr., Proc. Linn. Soc. N.S.W., 858, 1890).

Melbourne.

ANOMOCENTRIS. Meyr.

ACODIA. Ros.

190. A. PAUPER (Ros., Ann. Mag. N. H., 1885, 434, pl. xi., 7).
Melbourne and Toorak.

XANTHORHOE. Hb.

191. X. SUBIDARIA, Gn. (*Coremia subidaria*, Gn., x., 412; (?) *C. cymaria*, *ib.*, 415; *C. permissata*, Walk., 1,317; *C. regulata*, *ib.*, 1,318; *C. relictata*, *ib.*, 1,318; *C. acutata*, *ib.*, 1,319; (?) *C. sodaliata*, *ib.*, 1,410; *Xanthorhoe subidaria*, Meyr., Proc. Linn. Soc. N.S.W., 864, 1890).
Melbourne, Gisborne, Fernshaw, &c.

192. X. VACUARIA, Gn. (*Coremia vacuaria*, Gn., x., 418; *Xanthorhoe vacuaria*, Meyr., Proc. Linn. Soc. N.S.W., 866, 1890).
Gisborne, Melbourne.

193. X. PARADELPHA, Lower (Tr. Roy. Soc. S.A., 11, 1892).
Gisborne, Melbourne.

Mr. Meyrick, to whom I sent specimens, considers this a variety of the above. It is a well-marked form, however, and quite distinct in appearance.

*194. X. HYPERYTHRA, Lower (Tr. Roy. Soc. S.A., 12, 1892).
Gisborne, Melbourne.

195. X. ARGODESMA, Meyr. (Proc. Linn. Soc. N.S.W., 867, 1890).
Melbourne, Myrtleford.

196. X. EXTENSATA, Walk. (*Larentia extensata*, Walk., 1,195; *Xanthorhoe extensata*, Meyr., Proc. Linn. Soc. N.S.W., 867, 1890).
Melbourne, Fernshaw.

*197. X. REPENTINATA, Walk. (*Scotosia repentinata*, Walk., 1,356; *S. incertata*, *ib.*, 1,356; *Tephrosia breviaria*, *ib.*, Supp., 1,591; *Xanthorhoe repentinata*, Meyr., Proc. Linn. Soc. N.S.W., 868, 1890).
Melbourne.

*198. X. XERODES, Meyr. (Proc. Linn. Soc. N.S.W., 870, 1890).
Melbourne.

*199. X. HELIACARIA, Gn. (*Coremia heliacaria*, Gn. x., 420; *Xanthorhoe heliacaria*, Meyr., Proc. Linn. Soc. N.S.W., 872, 1890).
Gisborne, Melbourne, Sale.

This species varies in having nearly the whole of the markings obliterated by ground colour.

200. X. VICISSATA, Gn. *Coremia vicissata*, Gn., x., 421, pl. ix., 5; *Xanthorhoe vicissata*, Meyr., Proc. Linn. Soc. N.S.W., 872, 1890).
Melbourne, &c.

201. X. PERCRASSATA, Walk. (*Catopyrrha percrassata*, Walk., 1,065; *Xanthorhoe percrassata*, Meyr., Proc. Linn. Soc. N.S.W., 873, 1890).
Melbourne, Gisborne.

DASYURIS. Gn.

*202. D. DECISARIA, Walk. (*Fidonia decisaria*, Walk., 1,671; *Dasyuris decisaria*, Meyr., Proc. Linn. Soc. N.S.W., 875, 1890).
Melbourne.

203. D. EUCLIDIATA, Gn. (*Coremia euclidiata*, Gn., x., 420; *C. glyphicata*, *ib.*, 420; *Dasyuris euclidiata*, Meyr., Proc. Linn. Soc. N.S.W., 876, 1890).
Melbourne, Mt. Macedon.

FAMILY—MONOCTENIADÆ.

TAXEOTIS. Meyr.

204. T. ENDELA, Meyr. (Proc. Linn. Soc., N.S.W., 1,142, 1889).
Melbourne.

*205. T. EXSECTARIA, Walk. (*Panagra exsectaria*, Walk., 1,011; *Taxeotis exsectaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,144, 1889).
Melbourne.

206. T. DELOGRAMMA, Meyr. (Proc. Linn. Soc. N.S.W., 1,146, 1889).
Gisborne, Melbourne, &c.

*207. T. INTEXTATA, Gn. (*Panagra intextata*, Gn., x., 130; *P. perlinearia*, Walk., 998; *P. areniferata*, *ib.*, 998; *P. explicataria*, *ib.*, 998; *P. inconcisata*, *ib.*, 1,003; *Taxeotis intextata*, Meyr., Proc. Linn. Soc. N.S.W., 1,147, 1889).
Melbourne, Gisborne, Fernshaw, &c.

*208 T. INTERMIXTARIA, Walk. (*Panagra intermixtaria*, Walk., 1,000; *P. promelanaria*, *ib.*, 1,666; *Taxeotis intermixtaria*, Meyr., Proc. Linn. N.S.W., 1,149, 1889).
Melbourne.

209. T. ISOPHANES, Meyr. (Proc. Linn. Soc. N.S.W., 1,150, 1889).
Melbourne, Tanjil Track, Gunbower.

DARANTASIA. Walk.

210. D. FLAVICAPITATA, Gn. (*Tephrina flavicapitata*, Gn., x., 98; *T. capitata*, Walk., 965; *Darantasia mundiferaria*, *ib.*, 1,743; *D. flavicapitata*, Meyr., Proc. Linn. Soc. N S.W., 1,152, 1889).
Melbourne, Gisborne, &c.

NEARCHA. Meyr.

*211. N. BUFFALARIA, Gn. (*Panagra buffalaria*, Gn., x., 128; *P. ursaria*, *ib.*, 129; *P. transactaria*, Walk., 999; *P. resignata*, *ib.*, 1,003; *P. reserata*, *ib.*, 1,010; *Nearcha buffalaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,154, 1889).
Gisborne, Melbourne, &c.

212. N. SUBCELATA, Walk. (*Panagra subcelata*, Walk., 997; *Nearcha subcelata*, Meyr. Proc. Linn. Soc. N.S.W., 1,157, 1889).
Warragul, Windsor.

*213. N. CURTARIA, Gn. (*Panagra curtaria*, Gn. x., 129; *P. corrogata*, Walk., 997; *Nearcha curtaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,158, 1889).
Melbourne (South).

SATRAPARCHIS. Meyr.

EPIDESMIA. Westw.

*214. E. REPLICATARIA, Walk. (*Phrataria replicataria*, Walk., Supp., 1,700; *Epidesmia replicataria*, Meyr, Proc. Linn. Soc. N.S.W., 1,161, 1889).
Gisborne, Healesville.

215. E. CHILONARIA, H. S. (*Hemagalma chilonaria*, Herr. Sch., Exot., 350; *Panagra aurinaria*, Gn., x., 122, pl. vii., 7; *Epidesmia chilonaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,162, 1889).
Melbourne, Fernshaw, Dandenong Ranges, Macedon.

216. E. HYPENARIA, Gn. (*Panagra hypenaria*, Gn., x., 128; (?) *Hemagalma inspersa*, Feld., pl. cxxix., 19).
Myrtleford, Mt. Macedon, Melbourne, Oakleigh.

*217. E. TRYXARIA, Gn. (*Panagra tryxaria*, Gn., x., 128; *Epidesmia tryxaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,164, 1889).
Melbourne, Oakleigh.

Field Naturalists' Club of Victoria.

President:

MR. H. T. TISDALL, F.L.S.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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The Author of each article is responsible for the facts and opinions he records.

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THE

Victorian Naturalist.

Vol. X.—No. 7. NOVEMBER, 1893. No. 119.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held in the Royal Society's Hall on Monday evening, 9th October. The president (Mr. H. T. Tisdall, F.L.S.) occupied the chair, and in spite of the unfavourable weather there was an attendance of some sixty members and friends.

MEETING FOR PRACTICAL WORK.

At the monthly meeting for practical work held on the 25th September the common snail was taken as a subject. Details as to structure of the animal and directions (illustrated by diagram) for dissecting the same were laid before each member. As a further guide, several specimens previously prepared by Mr. A. G. Fryett were exhibited, showing the best method of "pinning out" the specimen after a complete dissection had been made. The Rev. W. Fielder, assisted by Mr. Fryett, had charge of the meeting, which was attended by a good many active workers.

PAPER.

By Dr. Thos. Cherry, Demonstrator in Pathology in the University of Melbourne, on "The Beginnings of Life."

In introducing the subject, Dr. Cherry defined clearly the difference between dead and living matter, and showed how very closely all living things are linked together by reference to the fact that man can appropriate parts of the lower animals direct, without the intermediate stages of digestion and assimilation. Thus skin and bone from the dog or cat, and the thyroid from sheep, can be transplanted with success to man, provided that surrounding circumstances are favourable to their growth.

The characteristic features of the physical basis of life (protoplasm) were then discussed, the amœba, as usual, serving the purpose of an example. Higher types were shown to be simply elaborations of a simple speck of protoplasm, the march of nature being summed up into the word *onward*, and this fact was referred to as a corner stone of a reasonable faith as to the future. It was inconceivable that *onward*, the watchword throughout all the bewildering immensity of time, should lead only to man as the crown of creation and then be changed to *backward* into darkness and death. Reference was then made to the two schools

of thought on the origin of life—viz., the advocates of spontaneous generation, and their opponents, who maintain that every living being arose from some pre-existing living form; and in criticising the spontaneous generation theory the occurrence and structure of bacteria were fully gone into, and the effect of sterilization in connection with the cultivation of bacteria showed the theory to have no basis of truth. The plastic nature of protoplasm was illustrated by reference to the life-history of several forms of bacteria, and its bearing upon the questions of the origin of species and the struggle for existence strongly insisted upon.

Altogether the lecture was full of suggestive thought, and the appreciation of the audience was evinced by the attentive and cordial manner in which it was received.

NATURAL HISTORY NOTE.

Mr. D. M'Alpine read the following note on a double-flowering specimen of Native Heath (*Epacris impressa*):—"In the latest number of the *Victorian Naturalist* Mr. T. S. Hart has given some interesting examples of the 'doubling' of native flowers, and I would like to add another to the list, as I am not aware of its being previously recorded. While on a botanical excursion with the students of the College of Pharmacy to Ringwood, on Saturday last, a solitary shrub of *Epacris impressa* was met with bearing 'double' flowers, and although numerous ordinary specimens were in the neighbourhood, not another example could be found. The calyx was normal. The corolla showed 'doubling,' the tube being single, while the lobes were 'double'—5 alternating with 5. A white core in the centre of the flower represented stamens and pistil. On unfolding this an outer coat showed indications of 5 lobes, but no appearance of anthers, while the innermost infolded tube exhibited a beautifully snow-white fringed margin, but no signs of an ovary. The so-called 'doubling' of wild flowers is replete with interest, and such abnormal transformation of parts of the flower throws light on the origin of floral structures."

EXHIBITION OF SPECIMENS.

The exhibits of the evening were confined principally to wild flowers, the following being a list of the exhibitors:—Baron von Mueller (flowers collected by Miss Henley, Wangaratta, Mr. Oke, Beechworth, and Mr. C. French, jun., Sandringham); Messrs. C. French, sen., D. Best, and A. Thiele made a joint exhibit; Mr. G. Coghill exhibited about 100 varieties; Mr. T. S. Hart, 30 varieties; and Mrs. Martin and Messrs. R. Hall and F. Spry also made good displays. General exhibits were also set out: By Baron von Mueller.—Flowers and fruits of *Adansonia Gregorii* (Boabab Tree); also, moss (*Dawsonia superba*) with

two fruits on one stem, collected by C. Walter at Fernshaw. By Mr. G. A. Keartland.—Skin and eggs of Raven Crow (*Corvus corone*). By Mr. J. A. Kershaw.—Specimens of *Heteronympha paradelpha*, Lower, taken at Bulli, New South Wales, in March, 1893, by Mr. W. Kershaw (recorded for the first time out of Victoria).

PHOTO-MICROGRAPHY.

THE following is a *résumé* of the paper read by Mr. Frank L. Baker at the practical meeting of the Field Naturalists' Club on Monday evening, 24th April, 1893 :—

Photo-micrography is the name given to that process by which the enlarged image of an object as seen through the microscope can be permanently impressed upon a light sensitive surface.

It is about fifty years since the first specimen of this work was produced, and although it is yet practised only by few, and excelled in by still fewer, the pursuit of photo-micrography is extending and progressing, and will doubtless have a very powerful influence in the scientific education of the future.

The many advantages obtained by this work are almost too obvious to need mention. Previous to the introduction of photo-micrography drawings of objects had to be made by means of the *camera lucida* attached to the microscope—a very difficult and often unsatisfactory piece of work at the best—while, of course, there are many objects so fine in structure that the human hand could not draw them with anything like scientific accuracy. In photography, however, no line is too fine and no structure too intricate to be represented in all its detail on the photographic plate. Then, again, when an object has been drawn by means of the *camera lucida*, and much time spent in producing a single picture, with many imperfections, its sphere of usefulness is very limited, compared with that of a good negative, produced in less time, with less labour, and from which one can print innumerable copies. The photo-micrograph can be seen and appreciated by those who have never looked through a microscope. Objects illustrating cell structures of plants, or showing the ingeniously provided spider's foot, the exquisitely delicate markings of diatoms or the infinitesimally small typhoid and cholera bacilli, can thus be readily and accurately shown in pictures which can pass from hand to hand, educating wherever they are seen. Furthermore, from the photographic negative can be made a slide by means of which objects otherwise invisible, except with the highest powers of the microscope, can be enlarged in the optical lantern to a diameter of 20 or 30 feet and shown to a large audience.

Then, again, immense improvements are being made in photo

lithographic printing. I am told that by a new process copies can be produced from a photo-micrographic negative at the rate of some thousands per week, each one of them superior in detail to the ordinary photographic print, and preserving *exactly* the accuracy of the negative.

Photography, too, is true. When examining a delineation of a microscopic specimen obtained by this means, you may feel satisfied that it presents, at least, one aspect of the object. It is a truthful rendering of what the microscope has actually enlarged; and says Dallinger, in his work on the microscope:—"It must be remembered that photo-micrography, by constantly covering a wider area of application with its ever increasingly delicate and subtle methods, is more penetrating in its revelation of structure than the human eye."

Photo-micrography is an amalgamation of microscopy and photography. A lifetime of study is not too long to exhaust either of these subjects; and, necessarily, while many men are well equipped in one, the number of those who are thoroughly versed in both is very small. It will not suffice, however, to be a microscopist with only a smattering of photography; but to excel in photo-micrography one must be conversant with both subjects. Before commencing this work with any hope of success, one must make himself thoroughly acquainted with the optical and mechanical parts of his microscope; and in addition to the ordinary photographic processes he must also familiarize himself with the great variations in exposure requisite under different conditions, as, for instance, upon different lengths in the extension of his camera, the different powers applied to the microscope, and the degree of opacity and the sensitiveness of colour of the objects to be photographed.

We must now pass on to the practical portion of our subject, and first of all we will decide what instruments and apparatus are necessary for photo-micrography.

I shall not take up your time by describing the more complicated instruments devised for this work, my object being more particularly to refer to apparatus in reach of all, and by means of which first-class photo-micrographs can be produced.

In regard to the microscope stand, this should be a good solid one, and extremely rigid. Photo-micrography with high powers demands the greatest convenience in the adjustments, and the very highest excellence in the mechanical parts of the apparatus employed. The microscope should have diagonal rack and spiral pinion to the coarse adjustment, and an efficient fine adjustment. With some fine adjustments it will be found that the appearance of an object left focussed for a minute or two will have slightly varied; so that it will be readily perceived that as photo-micrographs frequently require one hour exposure, it is very

necessary that the fine adjustment be of the most perfect type. With the instrument I have here (Watson's University microscope), a motion of 1-30,000th part of an inch can be imparted by means of the fine adjustment. The microscope should also be fitted with a rack-work substage, and it should be possible to swing the mirror completely out of the way.

The points I have mentioned are all required if good work is to be done, while many conveniences are not referred to, for the sake of simplicity.

Then, as regards objectives—there is even more importance attached to these—they should be achromatic, and corrected for the actinic rays. The best microscope objectives are adapted so as to give the finest visual effect, and if these be used for photography it will be found that when the object has apparently been in focus on the ground glass of the camera, the resulting photograph will *not* be in focus. In the construction of achromatic objectives it is impossible to get rid of all the colours of the spectrum by the conbination of flint and crown glass, owing to the fact that no two substances disperse all the different colours proportionately. The manufacturer has the choice as to which rays shall be corrected so as to be brought to the visual focus of the objective, and generally the rays at the violet end of the spectrum, which exercise the greatest influence on chemical compounds, such as those employed in photography, are not so included, and form an invisible image at a point nearer to the objective than the visual focus. Of course by a little experiment one can soon find out whether his lenses are corrected for photography or not, and if one could not conveniently get his objective corrected so that the actinic rays should coincide with the visual rays, the difficulty may be got over by the interposition of a weak concave lens (the power needed being ascertained by experiment) between the objective and the ground glass when focussing—removing it when the exposure is to be made.

As regards eye-pieces, some writers recommend that work should be done without these, on the score that they are intended to project the image on to the human retina, and not on to the flat surface of a photographic plate; but I have frequently employed them and think the objection suggested is not a practical one, no defect making itself apparent in the completed photograph. The employment of eye-pieces has these advantages:—(1) A shorter bellows camera can be used; (2) a greatly diminished exposure will suffice; and consequently (3) a great saving of time is effected.

About the camera little need be said. The one I have here is admirably suited for the best work. You will notice that it has a rod at the side by means of which the fine adjustment of the microscope can be turned from the back of the camera. It

has also a scale of inches marked on the base board, so that one may keep a record of the length of extension employed. These are desiderata for the work, although an ordinary camera of any size can be utilized for low power work, and be capable of producing good results.

The next important subject is the illuminant. Daylight is seldom used, owing to its uncertain intensity; limelight is more generally employed by experienced photo-micrographers, the advantage of which lies in its brilliancy and constancy. If a small oil lamp, such as I have here, be used, there are some objects—as bacilli, for instance—which, when enlarged by means of a high power objective, appear very dim on the ground glass of the extended camera, and are consequently very difficult to focus, whereas with the limelight they would be easily distinguishable. However, for the sake of convenience we will restrict our attention at present to the use of a microscopical oil lamp as illuminant. An iron chimney with a small opening, such as that provided in the pattern here, has several advantages over other kinds. It is practically unbreakable, and almost all the rays from it can be concentrated on to the object. If the small 3 x 1 slip should meet with an accident it can be very readily replaced.

A large bull's-eye condenser should be used to concentrate the light from the lamp, and where high powers are used and critical work is to be done a substage condenser will also be essential (an achromatic condenser of large numerical aperture is required for producing the best results).

Having now decided what instruments are necessary for the work, and assuming that such small accessories as dry plates, chemicals, dishes, sensitive paper, printing frames, &c., have been procured, we will proceed to describe the processes connected with photo-micrography.

The first step will be to centre the substage condenser. This needs to be very accurately done if our photographs are to be of first-class quality. The smallest diaphragm of the condenser should be inserted, and with a low power the body of the microscope should be adjusted till the image of the diaphragm is seen in the field. If it does not appear exactly central, the substage centering screws must be turned till this result is obtained; the stop should then be removed.

The next step will be to focus the light from the lamp upon the object. Screw on a 1-inch objective, displace the mirror and arrange the microscope in a line with the light in a horizontal position; then place an object on the stage and focus it, after which the substage with condenser should be racked up and down till the image of the flame is seen well defined in the centre of the field.

I may here mention that if the substage were always used in

exact focus, the image of the flame, in working with low powers, would only cover a small portion of the field. If it is required that light shall be distributed over the entire field, this can be attained either by racking the substage condenser a little out of focus, or by removing the substage condenser altogether and using only the bull's-eye. Sometimes a piece of ground glass is interposed between the condenser and the object so as to diffuse the light. For some low power work I have found an optical lantern with 4-wick lamp answer all purposes, by removing the front projection lens and allowing the 4-inch condenser to project equal rays of light over the surface of the object, in the same manner as it does over a lantern slide; but it must be remembered that in order to produce a critical image the source of light must be focussed on the object by the condenser. Also, to produce best results it is necessary that the condenser and object glass shall be of equal aperture, or thereabouts. The advantages of this arrangement are fully demonstrated in Carpenter on the Microscope, in which it is shown that where the aperture of the condenser is reduced to less than half that of the objective there is a diffraction effect.

Having, then, centred the condenser and focussed the light, the next step will be to place the light, the microscope, and the camera in their relative positions. The object to be photographed must now be placed on the stage of the microscope and focussed, and the eye end of the microscope inserted in the front of the camera, care being taken to make the connection light-tight. If the image of the lamp-flame has been previously focussed, it should be seen upon the ground glass of the camera, and by its position can be ascertained whether the axis of the camera coincides with that of the microscope.

The camera seen here has a front board for holding the lamp and microscope, which swings round on a pivot. By this means the preliminary work of arranging the light and focus and centering the object can be done in a convenient manner, and the instrument can then be turned round into position in front of the camera. It will be found that the objective needs to be focussed a little nearer to the object to yield a sharp image on the ground glass of the camera than it did when used for observation with the microscope alone.

In order to prevent an out-of-focus appearance in the photograph, objects should be so prepared that they present one even surface, which shall be in strict coincidence with the optical plane of the lens employed. This, however, can only be done in a very limited number of objects, and in the case of such objects as butterflies' eggs or deep diatoms one must judge for himself whether the best result will be obtained by resolving one plane without paying attention to any other plane, or whether

that end can be gained by means of a general sharpness all over. With the generality of subjects, however, it is best to focus some characteristic part perfectly, making it well defined. If the photograph is to be of a spider's claw the comb is perhaps the most necessary part to be perfectly focussed, or if a blowfly's proboscis, one would do well to give special prominence to the hairs which are on the lining membrane.

However, we will now assume that position and focus of the object has been decided upon. After removing the ground glass, the dark slide which contains the photographic plate upon which the image is to be formed should be placed in position. Interpose a piece of dark substance between the light and the condenser, withdraw the shutter to uncover the plate, and expose.

As regards the duration of exposure, this is so dependent upon different classes of subjects, varying qualities of illumination and degrees of magnification, that it is one of the most difficult matters that the photo-micrographer has to decide. In order to take full advantage of the experience gained by errors and successes in past attempts, it is necessary that some kind of tabulated record should be kept. The following is a suggested list of columns for such a record :—(1) No., (2) subject, (3) how stained, (4) objective employed, (5) eye-piece used, (6) length of extension of camera, (7) light used, (8) means for focussing light on object, (9) exposure given, (10) developer used, (11) general remarks as to result.

Of course the staining of the specimen is an important consideration. The colours at the violet end of the spectrum are the most actinic, while those at the red end are capable of producing hardly any visible chemical effect; consequently, an object which has been stained a deep red will require a very prolonged exposure, and, even at that, is generally incapable of yielding other than a flat, uninteresting photograph, lacking in contrasts and brilliancy. Also, if an object is stained in parts blue or violet and in other parts yellow, the former will appear light in the resulting photograph, while the yellow rays will appear dark, thus reversing their natural intensity of shade. To in some measure rectify this there is what is known as an orthochromatic plate supplied by some makers, which has the advantage of rendering these colours in their true gradation of light and shade. These plates are effectual in receiving the impressions from yellow rays, but in order to reduce the intensity of blue and violet rays it is necessary to interpose a piece of yellow glass between the source of light and the condenser.

The processes for developing the latent image in the sensitive plate, and printing and preparing the finished photograph, also the subject of remedying defects in negatives, are,

for the sake of brevity, here omitted; suffice it to say that these operations are almost entirely similar to those used in ordinary landscape photography, instructions for which can be found in one of the many excellent handbooks on the subject which abound at present.

In conclusion, I may say that there is a large field open in the direction of photo-micrography for anyone with enthusiasm, patience, and a little spare time. As regards these latter, with some objects a prolonged exposure of an hour or more is quite necessary, under which circumstances one can frequently adjust his apparatus and devote his attention to other recreations while the light does its work.

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., LL.D., F.R.S.

(Continued.)

Hemigenia Tysoni.

Tomentellous; leaves very small, simply opposite, lanceolate-linear, channelled, short-pointed, towards the summit recurved, from the axils often fascicled; flowers solitary, nearly sessile; bracteoles much shorter than the calyx, generally rhomboid-lanceolar; tube of the calyx rather slender, obconical; lobes all nearly deltoid or the lower semilanceolar, about half as long as the tube; corolla bluish, outside upwards beset with scattered hairlets, downwards glabrous, inside below the lobes barbellate; lowest lobe much dilated; lateral lobes hardly half as long as the lowest, somewhat longer than the upper, almost semielliptic, upper lobes connate into a short-sinuate one; connective of all the anthers both ways elongated, of the lower glabrous, of the upper barbellate at one end; style and ovulary glabrous.

On hills near Mount Narryer; Isaac Tyson.

Indument partially floccous. Leaves only $\frac{1}{8}$–$\frac{1}{4}$ inch long. Corolla measuring $\frac{1}{2}$–$\frac{2}{3}$ inch in length. Ripe fruitlets not obtained.

Might systematically be placed near *H. curvifolia*, but the vestiture is shorter, the leaves are much smaller, the flowers scattered, the bracteoles and calyx-lobes broader; the comparison of fresh flowers of these two species would doubtless reveal other differences.

Baron von Mueller has last month withdrawn from the directorship of the International Academy for Botanic Geography of Le Mans, as he disapproved of several of the measures adopted there.

BOTANICAL NOTES FROM NORTH-WEST AUSTRALIA.

Baron von Mueller, K.C.M.G., forwards the following notes from a correspondent at Derby, N.W. Australia :—"I expect to have no difficulty in forwarding you a cornsack full of the fruit of the Gouty Stem (*Adansonia Gregorii*), or, as it is generally termed locally, the 'Boabab' tree, as the tree occurs all along the coast that I have visited—a distance of about 600 miles. The tree is certainly an interesting figure in the botanic world. It is such a conspicuous object as to almost always attract attention. Its venerable and corpulent form stands clearly out from surrounding vegetation on sloping cape or rugged headland, along almost every mile of our coast, but in alluvial flats or on extensive plains it usually achieves its greatest growth. I have seen some monsters that must be many hundreds of years old, the apparently great age of which tempt one to parody the late laureate's lines and say of it—"Trees may come and trees may go, but I grow on for ever." They certainly bear the scars of many a doughty battle with the ever-varying assaults of the elements. Near Derby, round which many interesting specimens of it may be found, lies a unique sample of its kind. Possibly a thousand years or so of wet seasons have draped its short stout arms with foliage, and a thousand years or so of summer suns have brought forth their tribute of sweet-smelling blossoms; cut down then to make way for a road for the advance guard of the armies of civilization, and rolled on to the roadside, this hale old tree still greets the coming of the summer rain and summer sun with bursts of foliage, attesting the imperishable vigour and vitality of its species. *I have never met a dead Boabab*, and observant bushmen of wide experience on being questioned on the subject have not been able to recall any recollection of having seen a Boabab tree with the form and semblance of death upon it. From my own observations, I should say that one of the reasons of the tree's great vitality lies in the fact that it stores its own water. At the end of the wet season it is full of sap, and if pierced after five or six of the dry months have passed, the volume of this will not have decreased to any noticeable extent, creating the impression that the tree has been husbanding its resources, and merely exists in a state resembling dormancy during the prevalence of the dry months. The opinion that the Boabab only grows where it can get a constant supply of water appears to me erroneous, for I have seen it growing on cliff-sides and on sharp hill-slopes in such positions as to render it impossible to imagine that any subterranean water supply could exist. Another tree, a member of the genus Eucalyptus (perhaps *E. terminalis*), that we call the Grey Box, sometimes exhibits the same or somewhat similar habits, either as a characteristic trait of its species or as a coincidence.

I have felled a good many of these trees, and have frequently found in their almost invariably hollow stems several quarts of water. Whether this water has found its way in through some unobserved hole or flaw in the wood, and been preserved from evaporation by the hard wood-case that surrounds it, or has been absorbed through the roots of the tree, I cannot say, but it is very often there. To return to the Adansonias. The inveterate habit of these trees is to shed their leaves after the rains have gone over, but a curiosity of its kind—(possibly a Sterculia, F. v. M.)—in Derby has worn a copious glossy foliage throughout the seasons for upwards of eight years, and is the only example of its sort noticed in the district. Another tree that I was fortunate enough to discover, and of which I have made a sketch, is the one mentioned on page 44, vol. ii., of Captain King's voyages, upon which the *Mermaid's* name was cut. The characters H.M.C. MERMAID, 1820, in foot letters, are yet perfectly clear, and promise to all appearance to survive at least another 100 years. The tree is close to the beach in Careening Bay, and is easily found."

NOTES.

An interesting article on "The Platypus and its Gippsland Haunts" appeared in *Scribner's Magazine* for June, 1893, from the pen of Mr. Sidney Dickenson.

Chambers's Journal for April, 1893, contained an article giving some interesting facts on the "Avi-Fauna of the Furneaux Group," the islands in Bass' Straits which several members of the Field Naturalists' Club purpose visiting during the current month.

At the recent annual meeting of the Surrey Hills Field Club, an interesting report of the year's doings was presented, and Baron von Mueller, in an address to the young people, urged them to create a liking for observing the works of Nature, and showed the pleasures and development of mind and body arising from such a pastime.

It is rumoured that another suburban field club is about to be started. We wish it every success, and hope to see rivals in other districts.

A work recently issued by the Smithsonian Institution, Washington, U.S.A., entitled "Life-Histories of North American Birds, with Special Reference to their Breeding, Habits, and Eggs," by Captain C. Bendire, in which attention is called to the rapidly diminishing numbers of many well-known North American birds, forms the basis for an interesting article in the *Nineteenth Century* for April, 1893.

THE FLORA OF THE PHARAOHS.—The oldest herbarium in the world is in the Egyptological Museum, Cairo. It consists of a large number of plants, dried 5,000 years ago, and recovered from sarcophagi. The colours of most of the specimens are excellently preserved. By soaking the plants in warm water, pressing, and re-drying, they are rendered suitable for herbarium purposes. Among the plants most constantly used by the ancient Egyptians for the decoration of the dead were the White and the Blue Lotus, the Red Poppy, the flowers of the Pomegranate, Safflower, *Chrysanthemum coronatum*, and Mallow, as well as the leaves of the celery, the onion, and the leek. Many of the plant-remains were identified by Schweinfurth, the African traveller, and a special treatise on the Pharaonic Flora has recently been written in French by V. Lovet, and published in Paris.—*Chemist and Druggist*, 27th May, 1893.

BUTTERFLIES AT ELECTRIC LIGHT.—At about ten o'clock one evening last week, during a thunderstorm, I was taking moths, attracted by the arc lights in this town. Amongst other insects I took five specimens of *Pyrameis Kershawii* and two of *Junonia vellida*. The butterflies were flying round the lamps, and very anxious to get inside. I always understood this peculiarity was confined to moths as far as Lepidoptera are concerned.—F. L. BILLINGHURST, Castlemaine.

INSTINCTS OF THE CODLIN MOTH.—One evening last autumn I was supping with a friend, and he brought up a bottle of lager beer from his cellar. On removing the tinfoil from the cork a larva of the Codlin Moth was exposed to view, having eaten out a little hollow in the cork, evidently preparatory to assuming the pupa stage. My friend told me nearly every bottle he opened had a similar grub in the cork. Later on it transpired that the bottles had been in his cellar some time, that he had a pear tree infested with the moth, had gathered the fruit before it was ripe and laid it in his cellar alongside the beer, so it was evident the grubs had emerged from the fruit as usual, and scented the corks in the bottles—cork being, of course, tree bark, and as they usually go through the pupa stage in the crevices of the bark of the trees they have ruined, considered the cork to be very good substitute.—F. L. BILLINGHURST, Castlemaine.

WANTED TO EXCHANGE.—*Nature* (unbound), 5th June, 1873, to 5th August, 1882, for transactions of Australian societies, or any works relating to Australian Natural History.—F. L. Billinghurst, National Bank, Castlemaine.

[Several of these notes have been held over owing to pressure on the pages of the *Naturalist*.—ED. *V.N.*]

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part VII.

DICHROMODES. Gn.

218. D. AINARIA, Gn. (ix., 321, pl. iii., 5; *D. divergentaria, ib.*, 321; *Cidaria metaxanthata*, Walk., 1,734; *Dichromodes ainaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,170, 1889).
Melbourne, Gisborne, &c.

*219. D. ANELICTIS, Meyr. (Proc. Linn. Soc. N.S.W., 1,172, 1889), Kewell.

220. D. ODONTIAS, Meyr. (*loc. cit.*, 1,173, 1889).
Beechworth.

221. D. DISPUTATA, Walk. (*Panagra disputata*, Walk., 1,009; *P. dentigeraria, ib.*, 1,665; *Dichromodes disputata*, Meyr., 1,173, 1889).
Victoria.

*222. D. OBTUSATA, Walk. (*Panagra obtusata*, Walk., 1,008; *P. devitata, ib.*, 1,010; *Dichromodes obtusata*, Meyr., Proc. Linn. Soc. N.S.W., 1,177, 1889).
Sandringham, Grampians.

223. D. EXPLANATA, Walk. (*Panagra explanata*, Walk., 1,009; *Dichromodes explanata*, Meyr., Proc. Linn. Soc. N.S.W., 1,179, 1889).
Melbourne, Gisborne.

*224. D. ATROSIGNATA, Walk. (*Panagra atrosignata*, Walk., 1,009; *Eubolia linda*, Butler, Ann. Mag., 1882, 96; *Dichromodes atrosignata*, Meyr., Proc. Linn Soc. N.S.W., 1,184, 1889).
Oakleigh, Melbourne.

225. D. INDICATARIA, Walk. (*Eubolia indicataria*, Walk., 1,698; *Dichromodes indicataria*, Meyr., Proc. Linn. Soc. N.S.W., 1,186, 1889).
Melbourne.

*226. D. STROPHIODES, Lower (Tr. Roy. Soc. S.A., 155, 1893).
Grampians.

227. D. TRIPARATA, Walk. (*Panagra triparata*, Walk., 1,005; *P. molybdaria, ib.*, 995 (*nec* Gn.); *Dichromodes triparata*, Meyr., Proc. Linn. Soc. N.S.W., 1,190, 1889).
Melbourne.

*228. D. CONSIGNATA, Walk. (*Panagra consignata*, Walk., 1,006; *P. petrilineata*, *ib.*, 1,008; *Dichromodes consignata*, Meyr., Proc. Linn. Soc. N.S.W., 1,191, 1889).
Melbourne.

229. D. STILBIATA, Gn. (*Liodes stilbiata*, Gn., x., 120, pl. xviii., 4; *Panagra plusiata*, Walk., 1,007; *Dichromodes stilbiata*, Meyr., Proc. Linn. Soc. N.S.W., 1,192, 1889).
Gisborne, Kewell, &c.

230. D. CONFLUARIA Gn. (*Panagra confluaria*, Gn., x., 131, pl. vii., 8; *Dichromodes confluaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,193, 1889).
Melbourne.

OENONE. Meyr.

ASPILATES. Tr.

This genus has been referred by some writers to the Noctuina, but Meyrick has delineated the characters (Proc. Linn. Soc. N.S.W., 1,196, 1889). The so-called *Aspilates* (?) *inostentata*, Walk., is referable to the *Noctuina*.

231. A. CHORDOTA, Meyr. (Proc. Linn. Soc. N.S.W., 1,196, 1889).
Melbourne.

EUMELEA. Jard.

XENOMUSA. Meyr.

232. X. MONODA, Meyr. (Proc. Linn. Soc. N.S.W., 1,198, 1889).
Melbourne, Trafalgar.

ONYCHODES. Gn.

233. O. LUTOSARIA, Feld. (*Arhodia lutosaria*, Feld., pl. cxxiv., 15–17; *Onychodes lutosaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,200, 1889).
Melbourne.

ARRHODIA. Gn.

234. A. LASIOCAMPARIA, Gn. (ix., 186 (Arhodia); *A. retractaria*, Walk., 282; *Nigasa subpurpurea*, *ib.*, 287; *Arhodia semirosea*, *ib.*, Tr. Ent. Soc. Lond., i., 3rd ser., 267; *Arrhodia lasiocamparia*, Meyr., Proc. Linn. Soc. N.S.W., 1,202, 1889).
Marysville, Fernshaw, Melbourne, Warragul.

GASTROPHORA. Gn.

235. G. HENRICARIA, Gn. (ix., 187, pl. xxi., 4; Meyr., Proc. Linn. Soc. N.S.W., 1,202, 1889).
Melbourne.

PHALLARIA. Gn.

236. P. OPHIUSARIA, Gn. (ix., 186; *Œnochroma quaternaria*, H. S., Exot., 541; *Smerinthus Wayii*, Tepper, Tr. Roy. Soc. S.A., 29, 1889).
Warragul, Melbourne.

MONOCTENIA. Gn.

*237. M. VINARIA Gn. (*Œnochroma vinaria*, Gn. ix., 185, pl. vii., 2; *Balliace vetustaria*, Walk., 290; *Monoctenia vinaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,206, 1889).
Melbourne, Gisborne, Camperdown.

*238. M. DIGGLESARIA Gn. (Ann. Soc. Fr., iv., Ser. iv., 15; Meyr., Proc. Linn. Soc. N.S.W., 1,207, 1889).
I am not sure whether this species is Victorian. In Proc. Linn. Soc. N.S.W., p. 300, 1891, Dr. Lucas, of Brisbane, says he received a specimen from Mr. Kershaw, but gives no locality.

239. M. OBTUSATA, Walk. (279; *M. himeroides, ib.*, 279; *M. obtusata*, Meyr., Proc. Linn. Soc. N.S.W., 1,207, 1889).
Melbourne, Inglewood.

*240. M. SMERINTHARIA, Feld. (pl. cxxiv., 18, 19; Meyr., Proc. Linn. Soc. N.S.W., 1,208, 1889).
Melbourne, Healesville.

241. M. FALERNARIA, Gn. (ix., 184; *M. fraternaria, ib.*, pl. vii., 3; *M. falernaria*, Meyr., Proc. Linn. Soc. N.S.W., 1,208, 1889).
Gisborne, Melbourne.

HYPOGRAPHA. Gn.

FAMILY—DESMOBATHRIDÆ.

ZANCLOPTERYX. Herr Sch.

FAMILY—STERRHIDÆ.

STERRHA. Hb.

FAMILY—GEOMETRIDÆ.

PERIXERA. Meyr.

PROBLEPSIS. Ld.

DITHALAMA. Meyr.

*242. D. COSMOSPILA, Meyr. (Proc. Linn. Soc. N.S.W., 840, 1886).
Melbourne.

ACIDALIA. Tr.

*243. A. ALBICOSTATA, Walk. (779; *A. costaria, ib.*, 1,610; *A. albicostata*, Meyr., Proc. Linn. Soc. N.S.W., 844, 1886).

*244. A. PHILOCOSMA, Meyr. (Proc. Linn. Soc. N.S.W., 845, 1886).
Melbourne, Gisborne.

245. A. PSELIOTA, Meyr. (*loc. cit.*, 848, 1886).
Melbourne.

246. A. LYDIA, Butler (*Idœa lydia*, Butl., Tr. Ent. Soc. Lond., 1886, 435; *I. jessica, ib.*, 436; *Acidalia lydia*, Meyr., Proc. Linn. Soc. N.S.W., 851, 1886).
Melbourne, &c.

247. A. RUBRARIA, Dbld. (*Ptychopoda rubraria*, Dbld., Dieff., N.Z., ii., 286; *Acidalia figlinaria*, Gn., ix., 454, pl. xii., 8; *A. repletaria*, Walk., 778; *A. attributa, ib.*, 779; *Fidonia acidaliaria, ib.*, 1,037; *Acidalia rubraria*, Meyr., Proc. Linn. Soc. N.S.W., 852, 1886).
Melbourne, Springvale, Sale, &c.

*248. A. RECESSATA, Walk. (777; (?) *A. stipataria, ib.*, 779; *A. recessata*, Meyr., Proc. Linn. Soc. N.S.W., 856, 1886).
Melbourne, Gisborne.

*249. A. PERLATA, Walk. (776; Meyr., Proc. Linn. Soc. N.S.W., 860, 1886).
Melbourne.

TIMANDRA. Dup.

EUCROSTES. Hb.

250. E. ARGOCRANA, Meyr. (Proc. Linn. Soc. N.S.W., 867, 1886).
Melbourne.

COMOSTOLA. Meyr.

EUCHLORIS. Hb.

Meyrick (Tr. Ent. Soc. Lond., p. 95, 1892) has merged the genus *Iodis*—which name all the following species were known by—into the above genus, as being earlier.

*251. E. MEANDRARIA, Gn. (*Iodis meandraria*, Gn., ix., 355; Meyr., Proc. Linn. Soc. N.S.W., 874, 1886).
Moe, Gippsland.

252. E. STEREOTA, Meyr. (*Iodis stereota*, Meyr., Proc. Linn. Soc. N.S.W., 875, 1886).
Melbourne, &c.

253. E. FUGITIVARIA, Gn. (*Iodis fugitivaria*, Gn., ix., 354; Meyr., Proc. Linn. Soc. N.S.W., 876, 1886; *I. intacta*, Walk., 545; *I. obliquissima, ib.*, 546).
Melbourne.

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— OF —

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The Author of each article is responsible for the facts and opinions he records.

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THE

Victorian Naturalist.

Vol. X.—No. 8. DECEMBER, 1893. No. 120.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 13th November. The president (Mr. H. T. Tisdall, F.L.S.) occupied the chair, and there was an attendance of about forty members and friends.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library :—"Fourth Report of Missouri (U.S.A.) Botanical Gardens," from the Director ; "Proceedings of Academy of Natural Sciences, Philadelphia," 1893, part i., from the Academy; "Notes on Samples of Rock Collected at the 180 Mine, Bendigo," by A. W. Howitt, F.G.S., from the Mining Department, Victoria ; "On a Species of Crex-Crex Shot at Randwick, N.S.W.," by A. J. North, F.L.S., from the author ; and the *Evening Observer*, with report of Natural History Society of Queensland, from the Society.

REPORTS OF EXCURSIONS.

Reports of recent excursions to Melton (28th October) and Nar-Nar-Goon (9th November) were received from Messrs. G. A. Keartland and E. Anderson, and although few rare specimens were secured, the outings proved enjoyable to those who took part in them.

MEETING FOR PRACTICAL WORK.

A second demonstration on the common snail was given by Rev. W. Fielder to some fifteen of the members who attended on 23rd October. Mr. A. G. Fryett, as usual, assisted in the work, and very satisfactory progress was made. The Crayfish (*Astacopsis bicarinatus*) is the subject for dissection at the next meeting.

PAPERS.

1. "The Undescribed Uredospores of *Puccinia Burchardia*," by Mr. D. M'Alpine, F.C.S.

The chief interest of the paper was its treatment of one of the rusts of Victoria. About three years ago this rust was discovered in South Australia by Mr. J. G. O. Tipper, F.L.S., and named by Professor Ludwig after the host plant. On that occasion teleutospores alone were found, and those only upon the leaves ; whilst in the present instance uredospores were intermixed with teleutospores, and were flourishing upon the stem as well. Now, in rust of wheat (*Puccinia graminis*), the uredospores (summer

spores) appear first, and serve as a rapid means of multiplication, whilst the teleutospores (winter spores) are not visible till the autumn, to tide over the winter and serve for reproduction in the spring.

2. "The Swimming Birds of Australia," by Mr. Robert Hall.

Concise descriptions of distinctive species of seven families of swimming birds were given by Mr. Hall, and photographic illustrations of the same were thrown upon a screen by Mr. J. Searle. The lantern slides thus exhibited numbered nearly 100, and the audience was enabled by them to follow with ease and interest the distinguishing features of the birds selected for description. Typical specimens of the seven families were also exhibited by Mr. Hall—an exhibit which greatly enhanced the value of a very interesting and useful paper.

Mr. Searle's kindness in again placing his lantern at the disposal of the Club was alluded to in fitting terms.

NATURAL HISTORY NOTES.

Baron von Mueller forwarded a very interesting note on "The Furneaux Group of Islands," written by Mrs. Maclaine. The note had reference to the natural features, population, and productions of these Bass's Straits Islands, and being well written and filled with interesting details, proved very acceptable to members.

Mr. G. A. Keartland is desirous of settling the vexed question as to the number of the species of the group Corvus inhabiting Australia. For this purpose, in company with Mr. J. Gabriel, he visited a rookery on the Werribee Park estate of the White-eyed or Raven Crow, and his note embodied the results of their visit. It was written with a view to awaken observation on this point.

Mr. C. French, jun., recorded the finding of white flowers of *Patersonia longiscapa* and *Dianella longifolia*, near Spring Vale.

Mr. W. Stickland called the attention of members to a note in the *Illustrated London News* of 14th October, 1893, in reference to the office performed by blackbirds in accompanying cattle and removing the ticks, which form a veritable pest.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. A. Coles.—New Zealand Kiwi (*Apteryx Oweni*), Black-cheeked Falcon (*Falco melanogenys*), Black-faced Falcon from Melton. By Mrs. Flatow.—Frog from Fiji. By Mr. C. French, sen.—Group of Australian Longicorn Beetles, genus *Tragocerus*—viz., *T. formosus* (male and female), *T. Spencei* (male and female), *T. fasciatus* (male and female), *T. bidentatus* (male and female), *T. lepidopterus* (male and female); also, coloured drawings of same by C. C. Brittlebank, Myrniong, Victoria; also, specimen of a fungus growing from the body of dead larva of *Tetralobus Cun*

ninghami, a large beetle from Gippsland, Victoria. By Mr. C. French, jun. (collected near the You Yangs).—Nest and eggs of Singing Honey-eater and eggs of White-faced Xerophila—the eggs of the former not previously collected this side of Geelong, eggs of the latter not previously collected this side of the Dividing Range (on the authority of Mr. A. J. Campbell). By Mr. H. Giles —The Whistling Moth (*Hecatesia fenestrata*, Bdv.) captured at Nar-Nar-Goon, 4th November, 6.45 p.m. By Mr. R. Hall.—Representatives of the seven families of the swimming birds of Australia. By Baron von Mueller.—Two plants new to science —viz., *Hemigenia Tysoni*, from Upper Murchison River, collected by Isaac Tyson ; also *Grevillea Williamsoni*, from Mount Abrupt, collected by H. B. Williamson. By Mr. W. Scott.—Orchid *Caleya major*, from Nar-Nar-Goon. By Mr. F. Spry.—Larvæ of *Hypochrysops delicia* ; larvæ of *Pyrameis Kershawi* found feeding on *Ammobium alatum* ; case Queensland Lepidoptera.

EXCURSION TO MELTON.

This excursion, on Saturday, 28th October, was rather poorly attended ; however, an interesting day was spent. On reaching Melton we traversed the box timber on Mr. H. W. Staughton's estate. Bird life was more abundant than usual. We had not proceeded far when a clutch of Pied Grallina, out for their first fly, were noted, and the old birds' anxiety was no doubt relieved when they found we had no desire for a closer examination. Several nests of *Geobasilis chrysorrhœa* were passed, some of which contained eggs or young of the Bronze Cuckoo. Black Fantails, Restless, Brown, and White-shafted Flycatchers were seen, but a search for their nests was unsuccessful here. Entering the large timber, many parrots were seen, comprising Pennant's, Rosehill, Red-rumped, Blue-banded, also Musk and Little Lorikeets. A Sordid Wood Swallow kindly pointed out her nest on a stump. It contained three eggs, which were left undisturbed, either as a reward for her confidence or because they were hard set. In close proximity a Laughing Jackass was perched, evidently on the look-out for young birds or eggs (they are fond of both), and many Wood Swallows, Tree Creepers, Thickheads, and Fantails tried to drive it away without result ; they had not learned the art of throwing sticks so well as a member of the party, who sent it off in a hurry at his first attempt. We had just commenced to work in earnest when we found that while we were watching the birds a mob of bullocks were watching us, and as they evidently desired a closer examination, we decided to examine the country on the other side of the fence. Here we found the nests of the Brown Hawk, Butcher Bird, Tree Creeper, and Hooded Robin.

A start was then made for the gullies, and regret was felt at the smallness of the party, as with the limited time at our disposal we could do little more than scamper over what should prove good ground. Birds were plentiful, and in addition to many previously noted we found the Varied Grauculus, Yellow-tufted Honey-eater, and others. The Wattled Honey-eater was just commencing to build, whilst the White-eyebrowed Pomatorrhinus had her brood on the wing. On the bank of the creek a little Spotted Pardalote revealed her nest. The bird emerged from the ground within a yard of our feet, and on looking round a little hole was noticed; on tracing its course, it ran into the bank about 14 inches, ending in a chamber, where a ball-like nest of bark contained four pearly-white eggs. Close by Mr. Gabriel found the nest of the Yellow-tufted Honey-eater (*Ptilotis auricomis*) with one egg. As we were desirous of properly authenticating it, our gunner concealed himself in some bushes, and in five minutes secured the pair of birds, which were in splendid condition. We then made our way homewards, well pleased with our outing.—G. A. KEARTLAND.

EXCURSION TO NAR-NAR-GOON.

THIS excursion was fixed for Thursday, 9th November, in order to take advantage of the general holiday (Prince of Wales' Birthday) for an all-day outing. We left Prince's Bridge at 7.50 a.m., our object being "general collecting." On starting we mustered only four in number, but on arrival at our destination we found another member, accompanied by two juvenile visitors, had travelled in the same train. On alighting, the local leader (Mr. H. Giles) was waiting, and, after a few necessary toilet arrangements and a brief consultation, we at once started on the object of our visit.

We struck off north from the station for some distance, and after crossing the main Gippsland road, decided to enter the paddocks and shape our course north-easterly for the Ararat Creek, after crossing which we should arrive at what should and would have been a good spot in more favourable weather. But the previous day it had rained steadily from early morn to dewy eve, when a cold easterly wind sprang up, and, as we found to our discomfort, still continued, thus making collecting rather out of the question.

After we entered the paddocks we immediately began to beat and shake, and roll over logs, in quest of the dwellers underneath; but they, on this occasion, either had notice of our advent, or else had removed to warmer regions—anyway, they

were chiefly conspicuous by their absence. Nearly the first find was the pretty little coloured frog (*Rana*, sp.), of which a few specimens were transferred to the bottle. Proceeding on a little farther we found one of our visitors, Master Frost, had rolled over a log, under which a very small member of the snake tribe had taken up its abode. This proved to be the first and only one seen all day; it was a Copperhead (*Hoplocephalus superbus*), which we were told is known locally as the Black Snake, though of course that is quite a distinct variety, and in fact does not occur in the locality. Being too small for a specimen, we decided that it should not grow into one; it was therefore ruthlessly despatched and left for friend Jackass, who, as is usual with these ever curious birds, was taking observations from a neighbouring tree.

After this deed we resumed our search, but, with the exception of ants, very few indeed were the objects we found. However, by steady working, the common Longicorns (*Epithora dorsalis*, *Coptocercus aberrans*, and *C. rubripes*), together with a host of Elateridæ, were found under the loose bark of the gums. Shortly after our best capture of the day in Coleoptera was made, a splendid specimen of the Buprestidæ (*Astrœus navarchis*) being found resting on one of the shrubs. This promptly disappeared into Mr. Best's bottle.

As we neared the Ararat Creek we found a species of jumping spider, with its sac of eggs, of a rich raspberry colour, quite different, Mr. Frost informed us, to any he had taken before. After crossing the creek we came to what would have been a good collecting spot on a more suitable day, but we got nothing of note for some time, being finally rewarded with the rare ant-like longicorn, *Aphneope sericata*. A few Buprestidæ were also taken, but they were of the common sorts, the most abundant we noted being *Stigmodera macularia*, of which numbers were bottled. Here, too, we noted our young enthusiasts were busily engaged boxing some of the cryptozoic forms of life—viz., Planarian worms. Several kinds in fine condition were noted, including *Geoplana munda*, *G. Sugdeni*, *G. Steeli*, *G. dubia*, *G. quadrangulata*, and *G. alba* in endless variety of colours. We particularly noted that it ranged from pale fleshy white to a deep brownish white, and several were observed of quite a soft peach tint. Two varieties we did not feel sure of were taken by Mr. Frost for identification.

Having arrived at the spot chosen for our luncheon ground, supposed to be the Back Creek, but which was only visible in a small pool or two on account of the dense vegetation, we camped down to appease our hunger and slake our thirst, though some members suggested that the water seemed far more suitable for the investigations of Messrs. Fielder and Shephard than for

supplying the wants of our inner selves, but if it did contain living forms of Protophyta, Protozoa, &c., we managed to make them palatable.

As soon as our frugal repast was over, and we had finished lazily watching the wreaths of white tobacco smoke, we resumed our journey, taking a south-westerly course to again intercept the Ararat Creek, searching every available spot on our way, but with little success for about a mile or so; then we struck the creek, and decided to work along its banks, when we became suddenly aware that three of our party were missing. Fortunately, after a brief delay, we once more united, and eventually made the best of our way back to the hotel, where we found an excellent tea all ready for us. To this we did ample justice, after which we had but a few moments to spare ere our train left, thus bringing to a close what had been a very enjoyable day to all concerned.

The inclement weather of the previous day and the cold wind still prevalent had the effect of rendering Lepidoptera somewhat scarce, for though many species were doubtless about, they kept in their retreats and wanted a lot of looking after, whereas with warm weather and bright sunshine many butterflies and diurnal moths might have been expected. Altogether six species of butterflies were observed; *Pyrameis Kershawi*, of course, was in evidence; a single *Epinephile abeona* was disturbed, but lost; a female *Delias aganippe* was observed on the Exocarpus, probably depositing ova, and an *Ogyris*, thought to be *abrota*, was seen flying in the fitful sunshine, but being well out of reach we could only look and long. *Chrysophanus aurifer*, one specimen only, in beautiful condition, made the fifth species, and two Skippers (*T. ismene*, Newm., and *T. comma*, Kirby) were picked up, one from a log the other from a flower, both being semi-torpid, and having no inclination for flight whatever. Some of the common Geometers were numerous enough, *Dichromodes ainaria* especially being very abundant. *D. stilbiata* and *D. confluaria* likewise were much in evidence. We noted three species of Hydriomena, viz.:—*H. severata*, of which some very pretty forms were taken; *subochraria* and *correlata*, the latter sometimes being in shoals. The somewhat similar looking *Epidesmia hypenaria* and *Epidesmia tryxaria* were flying together in places, and shortly after the midday halt we struck a nice little corner where some very perfect specimens of *Melitulias graphicata* were secured. Among the Bombyces were *Porthesia obsoleta*, *Scoliacma bicolor*, *Termessa gratiosa*, *Mosoda sejuncta*, and *Asura lydia*, while a nice selection of "micros." were also obtained. Larvæ were not much sought after, but several *Tephrosia fractaria* and *Iodis submissaria* were observed feeding on the wattle; the stems of the Banksias were full of a small Cryptophasa, and one or two of the Messmates, where they had been rung, were so

studded with long cone-shaped case larvæ that they somewhat resembled quills upon the fretful porcupine.

Of Coleoptera the following were the principal families represented :—Longicornes, ten species ; Buprestidæ, nine ; Elateridæ, nine ; Cleridæ, three ; Cistelidæ, two ; and Curculionidæ, four.

The lizards *Hinulia Quoyii* and *H. Whiteii* were taken.

Botany was represented by some thirty species of plants in bloom.—H. Giles and Ernest Anderson, joint leaders.

NOTES ON A VISIT TO THE EBENEZER MISSION STATION.

By Dudley Le Souëf (communicated by Rev. W. Fielder).

(Read before Field Naturalists' Club of Victoria, August 14, 1893.*)*

In September of last year (1892) I spent a week at Ebenezer Mission Station, situated on the Wimmera River, about ten miles from Dimboola. The view (1)* given of the homestead shows the stone church on the left, the residence of the superintendent next, and the school-house on the right, the tree in the foreground being a Murray Pine (*Callitris verrucosa*). Opposite these buildings are the cottages (2) of the aboriginals, about six in number, built at a little distance from each other ; the picture shows the back of one of these cottages, with its dusky inhabitants, and well cared for they look. The Wimmera River (3) is about one hundred yards from the superintendent's house, and the view gives an idea of its appearance, with a fringe of red-gum trees *(Eucalyptus rostrata)* beautifully reflected in the still waters.

A belt of Mallee scrub grew about a mile from this point, and in it, under the guidance of a native, I was fortunate in finding the nearly finished nest (4) of a Mallee Hen *(Leipoa ocellata)*, but it was too early for eggs. The view shows the partly constructed mound. The leaves and other rubbish had been collected together by the birds for some distance round the nest, but only at one point had been scraped into the centre to form the mound ; the birds having to wait for a heavy fall of rain, so as to wet the leaves thoroughly before they could cover them over with sand to form the mound, and then, when sufficient heat had been generated, would commence laying their eggs. The nest here shown was so covered a few days after my visit. In the background a few specimens of the Mallee are seen, and also the plants, growing close to the ground, the berries of which afford the Lowans their principal food. The mound was four feet in diameter and two feet high. We found two places where

* The numbers (1) refer to the limelight views with which the paper was excellently illustrated.—*Ed. V. N.*

the birds had scraped out a shallow hole, with a small amount of sand round, preparatory to collecting the leaves, &c., into it.

Near here we came across a portion of the Mallee (5) which had been rolled with a heavy wooden roller drawn by a team of bullocks. The picture shows a lane rolled through the scrub, which would soon be burnt, the ground ploughed with a stump-jumping plough and put under cultivation, and the Mallee Hen driven from its natural haunt.

Near the edge of the scrub a troop of about twelve Corcorax (*Corcorax melanorhamphus*) had built their mud nest (6). The blacks say that all the birds help in the building of it and that the eight eggs are laid by several hen birds, for if one, when sitting, is killed, another will soon take her place on the nest, and the same after three or four have been shot. It is a curious fact that these birds seem to live in a small community, like another mud-nest building bird, the Grey Struthidea. The picture shows a nest situated on the branch of a tree about thirty feet from the ground.

Here is seen a near view (7) of the bulky structure, with the eggs, and showing how it is placed on the branch; its weight is about seven pounds, and it is lined inside with shreds of bark only.

On arriving again near the bank of the river, a Laughing Jackass *(Dacelo gigas)* was seen to fly out of a hollow in a small gum tree, and on the blackfellow climbing up he found two hard-set eggs in the nest which he held in his hand while the picture (8) was taken. A shower of rain had made the smooth bark very slippery and difficult to climb. The bird left the nest while we were still some distance from the tree, and, joining its mate, watched our proceedings.

The river (9) was flooded and running strong from recent heavy rain, and we crossed it in a big bark canoe, the gunwale of which was in some places only an inch above the water; anyhow we got safely across, and I was enabled to take a snap picture as the canoe, with four blackfellows in it, quickly glided down the stream past me. The one standing up propelled the craft by means of a long pole, which looked a risky proceeding.

We shortly afterwards passed the big redgum tree (10) from which the bark canoe had been taken, and the long forked stick leaning against it was used for loosening the bark from the tree after it had been cut round. A glimpse of the river is seen about ten yards from the tree on the left-hand side.

(11) Near here a footbridge had been erected across the river, but a portion of it had been washed away by a flood some short time previous to my visit, and the detached portion was sticking up on end against a tree which had fallen across the river. The stream is apparently subject to floods. When the water is high they cross in bark canoes, but when low, on a tree which had fallen across the river.

(12) Close by a belt of scrub we heard the wailing cry of the Australian Thick-knee *(Œdicnemus grallarius)*, the so-called Southern Stone Plover, or Curlew, and its two eggs were found laid on the bare ground. They were not easily detected, being of a similar colour to their surroundings; but their young, which lie perfectly still on being frightened, are more difficult still to find.

The Pomatostomus *(Pomatostomus superciliosus)*, or Barking Birds, were very numerous about here, and their bulky nests plentiful on the bull-oaks and thick shrubs. (13) The one shown was built near the top of a Eucalyptus sapling, close by the river bank. These active little birds go about in small flocks of about twelve, and they generally alight on the lower branches of a bush, and hop from branch to branch till they reach the top, when off they go again to do the same thing on another. Like the Corcorax, they all seem to help in building the nests, and on a small tree I have seen as many as five, which were built about the same time; the birds frequently roost at night in them, as I have on several occasions disturbed two or three old birds in a nest after dark. The two dark brown eggs were too far in to show in the picture.

That lively little bird, the White-shafted Fantail *(Rhipidura albiscapa)*, was occasionally seen in scrubby places, and one of their nests (15) was found on the branch of a small shrub on the river bank. All the Fantails seem to use cobwebs, more or less, for covering the outside of their nests.

On the topmost branches of a dead tree a pair of White-eyed Crows *(Corvus coronoides)* had built their nest (16) and reared their two young ones, which at the time of my visit were just ready to fly; but my black companion was anxious to secure them, so he climbed up the tree as far as the strength of the boughs permitted him, and then cut the branch with the nest on down; the young birds, flying to the ground, were easily secured.

On several occasions we saw the nests (17) of the Grallina, or Magpie Lark *(Grallina picata)*, and their mud nests were always built near the water, and frequently on a branch overhanging the stream. The nest shown was built on a dead branch, and it is not often that one is found built on a bough with so much incline, and the wonder is that it was not blown off. The old nests are occasionally used by other birds to build their nests in.

The next view (18) shows the nest of the Wattled Honey-eater *(Anthochœra carunculata)*, built near the top of a bull-oak; it looked very pretty, with the two pink-coloured eggs. The birds had lined their nests with sheep's wool and feathers. Another nest of the same bird is here shown (19), which I found in a very thick Melaleuca bush, growing close to the water's edge, and I had some difficulty in taking a photograph of it, although it

was only four feet from the ground. In the same bush were two other old nests of apparently the same species of bird, and perhaps of the same pair of birds, as it is not at all improbable that they return to the same bush two or three successive seasons to build their nests.

Not far from the homestead is a pretty view (20) of a bend in the river, and it was in some of the overhanging trees seen that the Grallinas built their nests. The bank on the right-hand side is low, and soon gets covered with water in flood time. Near this bend a pair of Sordid Wood Swallows *(Artamus sordidus)* had built their nest between a piece of bark and the rugged trunk of a large redgum tree. It was about eight feet from the ground, and just ready for eggs when found, but the materials that the nest was composed of were of a very similar colour to the surrounding bark, which made it difficult to distinguish. I have occasionally noticed other birds' nests built in a similar place.

On a small open piece of ground near the Mallee, a solitary tree was standing (22), and high up was situated the newly built nest of a Brown Hawk *(Hieracidea orientalis)*. We got it down, with the branch it was on, but found we were too early for the eggs. The picture shows how the twigs of which the nest was built were interlaced, the lining being fine strips of bark only.

Some thick Melaleuca bushes grew on the banks of a small creek, and in one of them I was fortunate in finding the nest (23) and eggs of the Spiny-cheeked Honey-eater *(Acanthogenys rufogularis)*. The two eggs seem large for the size and strength of the nest, which was built of grass, very like that of the White-plumed Honey-eater, and was hung on a branch instead of being built in a fork.

On the other side of the bank of the same creek I found the nest (24) of the White-plumed Honey-eater *(Ptilotis penicillata)*, popularly known as the Greenie. It was about three feet from the ground, and built on the dead hanging branch of a bush—a very uncommon position. The two pink-coloured eggs looked very pretty against the light-coloured material of which the nest was composed.

The Miners, or Garrulous Honey-eaters *(Myzantha garrula)*, were numerous, and a nest (25) with two eggs was found built on the slender bough of a Murray Pine. It was very prettily situated, although the picture hardly does it justice. These noisy birds are well known to everyone in the bush, and by following you with their continual chatter, give warning to other birds of your whereabouts, to which a collector rather objects. The bird is, as a rule, only found in lightly timbered country, and is just as numerous in New South Wales and Queensland as it is here.

Some splendid specimens of the redgum tree grew in this neighbourhood (26), and the picture shows one with the nest of an Eagle *(Aquila audax)* situated high up on the fork of a branch. It was the smallest eagle's nest I had seen. Near the foot of the tree three blacks were standing, and leaning against the trunk on the left hand side was a sapling, on which the natives placed their snares for opossums, as these animals will always ascend a tree on a leaning branch in preference to going up the straight trunk of the tree.

In a young olive tree (27) near the church, a pair of White-fronted Ephthianuras *(E. albifrons)* had built their cosy nest, which when found contained three fresh eggs. These birds were fairly numerous about here. I also found one of their nests on the road between Dimboola and Ebenezer; it was built in a thick bunch of hanging creeper. The nest shown here was only three feet from the ground.

A pair of Fuscous Honey-eaters *(Ptilotis fusca)* also had their nest not far from the house, in a thick Pittosporum bush (28); it contained two eggs. The birds were rather shy, and kept out of sight as much as possible. Their nest was not nearly such a neat structure as so many of the Honey-eaters' are; the lining was principally feathers.

We often heard the Wattled Plovers *(Lobivanellus lobatus)* on some swampy land not far from the river, and succeeded in finding a nest (29)—if nest it can be called, as it was a very slight hollow lined with a few bits of dried grass. It was interesting to watch the manœuvres of the bird, when we came near her nest, in her endeavours to draw us away. The nest was situated on a small elevation surrounded by shallow water. The bird, on seeing anyone approaching, leaves the nest, and quietly going to a distance of about one hundred yards, flies up, uttering loud cries, as if to make believe that the nest was there. The young of these birds are exceedingly hard to find, as when disturbed they remain perfectly still, and are so like the colour of their surroundings that one passes by them without their being detected. Mr. H. Law has observed that when this bird is disturbed when sitting, by sheep or other animals, it does not leave the nest, but energetically flaps its wings, so as to prevent its being trodden on by the animal.

There was another small bark canoe (30), which the blacks used for crossing the river, near the homestead. During my visit they had a football match with a neighbouring club, and about a dozen of their opponents were ferried over the river in this canoe, one at a time, and I noticed that the passengers got out much more quickly than they got in, and none stood up in the canoe, as the blacks are seen to be doing in the picture.

The cooing of the little Peaceful Dove *(Geopelia tranquilla)*

was often heard, and for some time I searched in vain for their tiny nests, but was at last rewarded by discovering one (31) on the bough of a dead tree, about forty feet from the ground. A blackfellow climbed up for me, and he saw two fresh eggs in it, but did not venture to go further along the branch than is shown in the picture, for fear of its breaking with his weight, so we threw him up a long stick, and he carefully rolled one egg off the nest over the edge, and then the other, and we caught them as they fell in our hats, which had our handkerchiefs in them to help to break the fall, and both were got safely. I could not well show the ground in the picture, as, if so, I should have had to go too far away to see the nest, which was only composed of a few small sticks placed loosely on the bough.

The evening before leaving I got a twilight view (32) on the river. Just at that time numerous bats were seen darting about in their zigzag fashion and catching the various insects on which they feed, and a pair of Boobook Owls that roosted by day in a big old redgum tree on the river bank, also added their cuckoo-like call to that of the various frogs, crickets, &c., &c.

Next day, leaving this interesting country and bidding adieu to my hospitable host, I returned to Dimboola, and having a few hours to spare before the train left for Melbourne, visited the reservoir, and from that place got a distant view (33) of the township, with Mallee scrub intervening, but it was getting late in the day when the picture was taken.

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Report on Victorian Coalfields*," by J. Stirling, F.G.S., Mining Department, Victoria :—

"Notes on the Fossil Flora and Fauna of the Gippsland Carbonaceous Area." Gives bibliography of the fossil flora of Victoria, together with lists of species and localities, also 13 figures.

In "*Proceedings of Linnean Society of New South Wales*," 2nd series, vol. vii., part 4 :—

"Descriptions of Australian Micro-Lepidoptera," by E Meyrick, B.A., F.Z.S. Describes 200 species belonging to 48 genera of the family Tineidæ, including many Victorian.

"Reference List of the Land and Freshwater Mollusca of New Zealand," by C. Hedley and H. Suter. Contains notes on the bibliography of Australian Mollusca.

In "*Transactions of the Royal Society of South Australia*," vol. xvi., part 2 :—

The reports of the Elder Exploring Expedition are continued, among which are reports on the Coleoptera, Hymenoptera, Orthoptera, Lichens, Fungi, Geology, &c.

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OTHER ANNOTATIONS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., LL.D., F.RS.

(Continued.)

Grevillea Williamsoni.

Diffuse; leaves small, rigid, broadish- or ovate-lanceolar, mucronate, beneath as well as the branchlets somewhat tomentellous and slightly sericeous, above glabrescent, at the margin but slightly recurved; flowers small, in short unilateral almost spicate racemes; bracts very short, but comparatively broad, fugacious; petals blunt, somewhat reddish or partly greenish, inside downward glabrous, outside scantily beset with hairlets; style thin, reddish, more than half exserted, at first much recurved, glabrous; stigma very small, convex, obliquely terminal, hardly longer than broad; hypogynous glandule extremely short; ovulary almost sessile villosulous-tomentellous.

In valleys between Mount Abrupt and Mt. Sturgeon; H. B. Williamson.

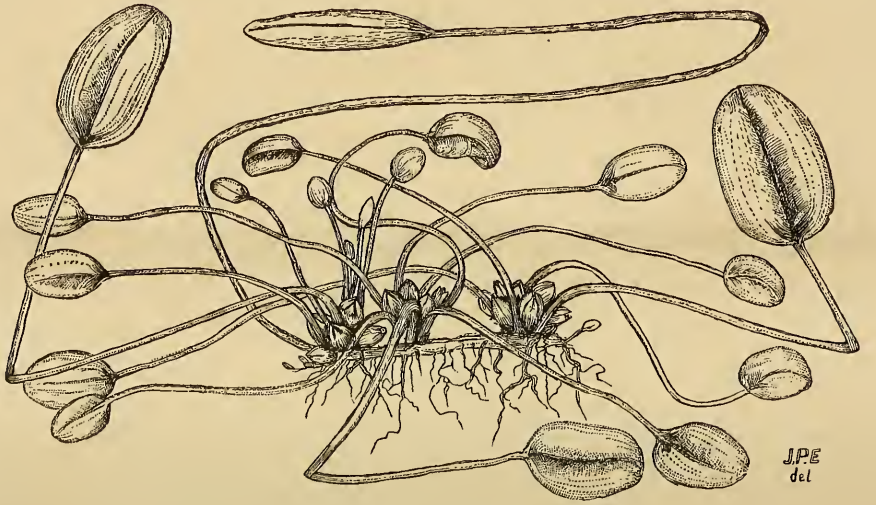
Height to three feet. Leaves short-petiolated, ⅓–⅔ inch long, acuminate. Peduncles short, tomentellous. Racemes about one inch long, when young more conspicuously indumentous. Flowers about a dozen in the raceme. Corolla through its recurvature hardly ⅓ inch long. Fruit not yet obtained. Aspect of *G. mucronulata*, but the pedicels are much shorter, the flowers are smaller and generally more numerous on a more elongated rachis, none of the petals are barbellate inside, the style is thinner, quite glabrous, proportionately longer and thus more exserted, and the stigma is less lateral. Moreover *G. mucronulata* is restricted to the most eastern regions of New South Wales. Indeed real affinity draws our new species nearer to *G. ilicifolia* and *G. Aquifolium*, notwithstanding the extreme difference in the foliage; besides, pedicels and stipes are also shorter, while the stigma is more depressed and smaller; the fruit may also prove different. Broad-leaved forms of *G. australis* approach somewhat our new plant in aspect; but its inflorescence is totally different, the ovulary is not glabrous, nor the stigma dilated, in our new plant.

In the last number of the *Victorian Naturalist* by a clerical oversight the name of the writer on Adansonia was omitted; the communication was from Mr. Æneas Gunn.

New or Rare Victorian Plants.—The habitats of the new Victorian plants in the list published in this number are indicated by letters signifying the divisions of the colony used in part 2 of "The Key to the System of Victorian Plants." It is also intended to publish occasionally woodcuts of rare Victorian plants in conormity with those contained in the abovementioned work.

LIMOSELLA CURDIEANA,

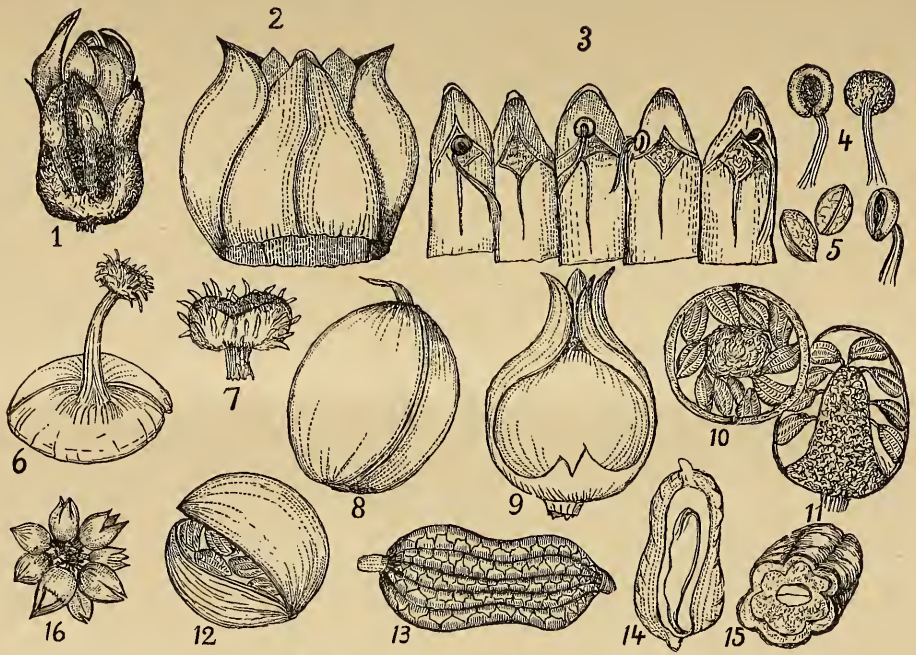
F. v. M., "Fragmenta Phytographiæ Australianæ," ix. 16 (1875).



Whole plant, natural size.

Drawn by J. P. Eckert.

LIMOSELLA CURDIEANA.



1, flower unexpanded; 2, corolla separated; 3, corolla laid open; 4, front- side- and back-view of stamen; 5, pollen-grains; 6, whole pistil; 7, separate stigma; 8, ovulary; 9, fruit, portion of calyx removed; 10 and 11, transverse and longitudinal section of fruit; 12, fruit dehiscent; 13, seed; 14 and 15, longitudinal and transverse section of seed; 16, cluster of flowers, All magnified, but to various extent, Drawn by J. P. Eckert.

PLANTS, NEW FOR THE COLONY OF VICTORIA, RECORDED SINCE 1889 (6 genera, 44 species).

Clematis glycinoides, De Candolle. E.
Cassytha paniculata, R. Brown. E.
Zieria aspalathoides, Cunningham. E.
Eriostemon stenophyllus, F. v. M. N.W.
Plagianthus glomeratus, Bentham. N.W.
Dodonæa humilis, Endlicher. N.W.
Drymaria filiformis, Bentham. N.W.
Scleranthus minusculus, F. v. M. N.W.
Kochia aphylla, R. Brown. N.W.
Babbagia scleroptera, F. v. M. N.W.
Gunnia septifraga, F. v. M. N.W.
Didymotheca thesioides, J. Hooker. N.W.
Sphærolobium daviesioides, Turczaninow. S.W.
Swainsonia monticola, Cunningham. N.E.
Eucalyptus Muelleri, Howitt. E.
Eucalyptus fruticetorum, F. v. M. N.W.
Cryptandra spathulata, F. v. M. N.W.
Didiscus glaucifolius, F. v. M. N.W.
Grevillea Williamsoni, F. v. M. S.W.
Aster Frosti, F. v. M. N.E.
Aster picridifolius, F. v. M. N.W.
Helipterum Jesseni, F. v. M. N.W.
Helipterum læve, Bentham. N.W.
Helichrysum Cunninghami, Bentham. N.E.
Helichrysum Stirlingi, F. v. M. N.E.
Cassinia lævis, R. Brown. N.W.
Quinetia Urvillei, Cassini. N.W.
Calocephalus Drummondi, Bentham. N.W.
Cotula integrifolia, J. Hooker. S.W.
Erechtites mixta, De Candolle. E.
Styphelia depressa, Sprengel. N.W.
Cryptostylis leptochila, F. v. M. S.
Prasophyllum Dixoni, F. v. M. S.
Prasophyllum Frenchi, F. v. M. S.
Corysanthes unguiculata, R. Brown. S.
Pterostylis MacKibboni, F. v. M. S.
Caleya minor, R. Brown. S.E.
Drakæa irritabilis, G. Reichenbach. E.
Caladenia Cairnsiana, F. v. M. S.W.
Smilax glycyphylla, Smith. E.
Xerotes dura, F. v. M. N.W.
Potamogeton tricarinatus, F. v. M. & A. Bennett. N.W.
Triglochin calcitrapa, Hooker. S.E.
Cystopteris fragilis, Bernhardi. N.E.

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President:

MR. H. T. TISDALL, F.L.S.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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A Meeting for practical work is also held on the fourth Monday in each month, at the Royal Society's Hall, at 8 p.m.

The proceedings of the Club are recorded in its journal—"The Victorian Naturalist." Annual Subscription, 7s., post free. (To members free.)

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor, Mr. F. G. A. Barnard, Kew.

Most of the numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Rev. W. Fielder, St. Kilda, at sixpence each; or in sets. Vol. I. (1884-85), 16 numbers, 7s. 6d.; Vol. II. (1885-86), 12 numbers, 6s.; Vol. III. (1886-87), 12 numbers, 6s.; Vol. IV. (1887-88) out of print; Vol. V. (1888-89), 12 numbers, 6s.; Vol. VI. (1889-90), 12 numbers, 6s.; Vol. VII. (1890-91), 12 numbers, 6s.; Vol. VIII., 12 numbers, 6s.; Vol. IX., 12 numbers, 6s.; each set with title-page and index for binding.

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— OF —

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The Author of each article is responsible for the facts and opinions he records.

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THE

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Vol. X.—No. 9. DECEMBER, 1893 (Part 2). No. 121.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, on Monday evening, 11th December, 1893, the president (Mr. H. T. Tisdall, F.L.S.) occupied the chair, and there was an attendance of some 60 members and friends.

LIBRARIAN'S REPORT.

The hon. librarian reported the following donations to the library:—"Further Notes on Australian Hydroids," by W. M. Bale, F.R.M.S., from the author; "Jahresbericht des Vereins für Naturwissenschaft," from the Brunswick (Germany) Natural History Society.

EXCURSION REPORTS.

Reports of recent excursions to Warrandyte and Clayton were received from Messrs. C. French, F.L.S., and E. Anderson.

MEETING FOR PRACTICAL WORK.

The usual monthly meeting for practical work was held on 27th November, when a demonstration on the anatomy of the Freshwater Crayfish *(Astacopsis bicarinatus)* was given by the Rev. W. Fielder. The external form was first described in some detail and then drawn by those present; after which attention was directed to the respiratory system, the different groups of gills being carefully removed and labelled according to their position of attachment. Full details of the anatomy, with illustrative diagrams, were distributed to those present, who were thus enabled to follow clearly the several points taken up—these directions also being of use to any members who wished to prosecute further studies at home. Mr. A. G. Fryett, as usual, gave valuable assistance in demonstrating.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. J. F. Bradly, H. Gunderson, and W. S. N. Powell were duly elected members of the Club.

RESIGNATION OF THE SECRETARY

The Rev. W. Fielder, who has acted as hon. secretary to the Club for over three years, then tendered his resignation, which was accepted with great regret, and Mr. H. P. C. Ashworth was nominated to take up the work.

PAPER READ.

By Mr. N. T. M. Wilsmore, M. Sc., F.C.S., entitled "The Food of Plants."

The paper opened by a reference to the properties of the various food stuffs of plants and of the elements of which they are mainly composed, and then treated briefly of the assimilative apparatus by means of which nutrition is effected. A strong case was made out in favour of increased attention to the artificial feeding of plants with proper nutrient material—a matter which could be decided by means of a few simple experiments.

The paper was illustrated throughout by experiments which enabled the audience to follow the theoretical portions of the subject with ease and profit, and regret was expressed on all sides that the full programme of experiments which had been prepared at considerable expenditure of time and labour could not be dealt with in the time at the disposal of the lecturer. Altogether the subject formed a fitting introduction to the course in structural botany which is proposed for the practical meetings during the early months of the coming year.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mrs. Bage.—Ammonites and other fossils from the Yorkshire coast, England. By Mr. A. Coles.—Pair White-eyebrowed Wood Swallows *(Artamus superciliosus)*, Australian Roller Bird *(Eurostomus Pacificus)*. By Mr. C. French, sen.—*Actias Mœnas* (male and female), India. By Mr. C. French, jun.—Nest and eggs of Lineated Acanthiza, from Oakleigh. By Mr. H. Grayson.—Mounted specimens of vegetable cells for microscopic examination (illustration of paper). By Mr. E. R. Hammett.—Lizard (abnormal). By Mr. T. S. Hart.—Abnormal growth of Foxglove. By Mr. G. E. Hill.—Longicorn beetle in Golden Willow, from R.H.S. Gardens, Burnley. By Mr. G. A. Keartland.—Yellow-tufted Honeyeater *(Ptilotis auricormis)*, with nest and eggs, taken at Melton; also egg of Pallid Cuckoo found in same nest; skins of Black-faced Grauculus *(G. melanops)* and Varied Grauculus *(G. mentalis)*, shot at Sandringham; Singing Honeyeater *(Ptilotis vittata)*, from Werribee. By Baron von Mueller, K.C.M.G.—A specimen of the extremely rare *Isopogon Fletcheri*, recently discovered by J. Fletcher, Esq., on the Blue Mountains, allied to the West Australian *Isopogon longifolius* as regards leaves, yet in floral characteristics more allied to *I. anemonifolius*, but with whitish flowers, glabrous outside. By Mr. G. Sweet.—Specimens of fossil fish from the Hawkesbury Sandstone (Triassic) at Gosford, New South Wales—*Cleithrolepis granulatus*, *Dictyopyge illustrans*, *Pristisomus* (sp.), and *Semionotus Australis*.

After the usual conversazione the meeting terminated.

BARRIERS TO MIGRATION, AND THEIR EFFECTS AS SHOWN IN THE AUSTRALIAN REGION.

By Miss L. J. Little, B.Sc.

(Read before the Field Naturalists' Club of Victoria, 11th September, 1893.)

My paper to-night is merely a compilation of the work of the latest authorities, often given in their own words. It is in no sense original work. I am chiefly indebted to my teachers, to A. R. Wallace, and to Professor Tate.

Bibliography:—Dr. Dendy's "Lectures on Geographical Distribution;" Professor Heilprin's "Distribution of Animals;" Sir J. Hooker's "Flora of New Zealand;" Captain Hutton's "Origin of Flora and Fauna of New Zealand" ("Annals and Magazine of Natural History, 1884–85);" R. Lydekker, *Nature*, 5th May, 1892; Sir F. M'Coy's "Prodromus of Victoria;" Professor Spencer's "Fauna and Zoological Relationships of Tasmania" (Australasian Association for the Advancement of Science)—Lectures on Zoology; Professor Tate's "On the Influence of Physiographic Changes" (Australasian Association); A. R. Wallace's "Island Life," 2nd edition; "Darwinism," 3rd edition.

Every foot of dry land has at one time or another formed part of a sea bottom. As the earth rises and falls each continent sinks beneath the sea again and again, and yet it never ceases to exist as a continent.

Connections between distant lands are made only to be broken, and as one geological age succeeds another the shape and condition of every land are altered. Yet the researches of the *Challenger* show that all land debris brought down by rivers to the ocean is deposited comparatively near the shore. Sand and gravel is laid down within a very few miles of shore; only fine sediment to 50 miles, and the very finest to 150 miles. Now, the whole series of marine stratified rocks, from the earliest Palæozoic to the recent Tertiary beds, consist of materials corresponding to those now being deposited within this narrow belt. Therefore all these stratifications must have been laid in shallow water and near to existing continental lands. There Nature has always strewn the dust of continents to be; and, according to Wallace, if we trace the 1,000 fathom line round all our existing continents, we mark out approximately the continental area—that is, the limits within which changes of land and sea have gone on during geological time. Inside this line has always been land and shallow sea in varying proportions. Yet we must remember that a depth of even a few feet of water would prevent the existence of terrestrial animals. It is impossible to exaggerate, or even to conceive, the effect of the endless mutations on the animal world. The whole population of living things slowly but surely must have been

driven backwards and forwards, from east to west, north to south, from one side of a continent to another.

How can we read the story of these changes? In only one way—by the study of the flora and fauna, living and fossil, of each country. These are the visible outcome and residual product of the whole past history of the earth. Geographical distribution appeals alike to the geologist and to the biologist. In comparing the past with the present distribution of life upon the globe, one cannot fail to notice a well-marked difference. Broad distribution appears to have been far more prevalent in the early period of the earth's history than now, and argues strongly for a predominance of more uniform conditions. This can be explained by the conclusion that greater facilities for dispersal, and more equable conditions of climate, existed then.

All the chief types of animal life seem to have originated in the great northern continents, and to have spread south. In the northern, more ancient and more extensive lands, development has been more rapid, and has given rise to higher types; while southern lands have produced modifications of lower grades of organization, whose ancestors came from north. As the first forms spread outward, they were not able to extend equally in all directions, meeting with various barriers on the way, such as oceans, rivers, climate, mountains, and deserts. Different animals would succeed in reaching different countries according to their powers of overcoming these barriers. Those which could swim or fly would have an obvious advantage where water was concerned; others, as birds, insects, might be driven by wind, or carried on logs by currents, &c. Even when they arrived in the new country, the climate and food might be suitable, or death might result. Connections between the different countries continually changing, the animals after arrival may be isolated for ages. The degree of peculiarity is an index to the length of the isolation. So we find that different countries have different animals. Certain animals and plants are peculiar to each, and others are more abundant there than elsewhere. Thus Africa is the home of the lion; sheep and goats characterize Europe and Asia: the whole world can be mapped out into zoological regions, each of which has a number of animals peculiar to itself. These regions are as follows:—I. Palæarctic; II. Ethiopian; III. Oriental; IV. Nearctic; V. Neotropical; VI. Australian. The Australian region includes Australia, Tasmania, New Zealand, New Guinea, and other islands. Its real limit lies between the islands of Bali and Lombok. Let us consider in what way the struggle has been carried on in this region, and its past history.

I. Flora.—Professor Tate has analyzed the Australian flora into the following elements:—(1) An immigrant part, derived from two

sources—(*a*) Oriental, dominant in tropical Australia; (*b*) Andean, restricted generally to high parts of Tasmania, Victoria, and New South Wales. (2) An endemic part, a localized type of which occupies the extreme south-west of the continent. The New Zealand flora has also South American, European, and Antarctic affinities. One-eighth of its flora is South American, and one-quarter Australian; but, strange to say, it has not those most highly characteristic Australian forms — Acacia, Eucalyptus, Grevillea, and Hakea, these are entirely wanting. If we follow Professor Tate's account of the flora we will be better able to understand its distribution. He divides it into three types—(1) Euronotian; (2) Autochthonian; (3) Eremian. If we pass from the coast to the interior, we pass from timbered grass land and forest land to a grass growth with a few shrubs, and beyond this the vegetation is strikingly dissimilar—it is the so-called saltbush country. This variation in botany is co-ordinate with a decreasing rainfall—thus, at Port Darwin the rainfall is from 50 to 75 inches; on the east coast, from 25 to 50 inches; in south-west, from 25 to 50 inches; but in the interior—that is, the saltbush country—we find it less than ten inches. (1) Euronotian in south and east. (2) Autochthonian in south-west; it coincides with a rainfall limit of 20 inches. (3) Eremian, dominant in dry region which has its centre in the Lake Eyre basin; it corresponds with saltbush country, and has rainfall of less than 10 inches.

The Autochthonian type of vegetation extends from Shark Bay to Cape Arid. The maximum rainfall is 46 inches. This region is smaller than the eastern, with no lofty mountains, and with deserts, yet it contains a far greater proportion of peculiar plants than the east. In purely Australian types it is far richer than the rest of the continent. This large and peculiar flora implies long-continued isolation. What physical causes have brought about and maintained that isolation? What are the barriers that have prevented the spread of this flora to the east? For in the Euronotian, though we do find many Australian types, they are mixed with European, Antarctic, and South American types, and many of the chief Australian types are wanting here. The Eremian region itself is, and always has been, the barrier. This botanic region has its centre at Lake Eyre, where the average rainfall is less than 5 inches; but the region is *not* a desert. It occupies an excessively dry region, which is an impassable barrier to the interchange of Autochthonian and Euronotian types. The only way of migration may have been by extension of south coast line in post-Miocene times. This climatic barrier has not always existed, for in Cretaceous times a large part of the east of this region was a bed of sea. South-west Australia is the remnant of a more extensive part of the continent. If we take the 1,000-fathom line around the southern part of Australia

to represent the probable extension of the old land, we shall see that it would give us a wide additional area, and form a continent which, even if the greater part of tropical Australia were submerged, would be sufficient for the development of a peculiar and abundant flora. This elevation of 6,000 feet would change the whole country, including the deserts in the interior, into mountainous and well-watered regions. Close following the extinction of the Cretaceous epoch was another submergence during deposition of old Tertiary bed. Besides this, the Pliocene Tertiary beds of median Australia were due to existence of great inland sea. Professor Tate claims for the Eremian region of this period a very much larger rainfall than it has now, and appeals to evidence of waterless large river channels, contracted and saline lake basins, and nature and deposition of sand ridges. But, from whatever cause, since Pliocene times Central Australia has been drying up, and the present barrier of climate to the migration of plants has simply replaced one different in kind—that is, arms of the sea and inland seas.

The conclusions drawn from a study of the flora are that—(1) The Autochthonian region, with its highly specialized Australian types and its long-continued isolation, is of greater antiquity. (2) That Euronotian flora was modified during early Tertiary times by primitive European types, and has received in recent times greater accession of Asiatic races.

II. Fauna.—In case of the fauna we find the converse of the vegetation, for morphological variety is greatest in the Euronotian region.

Mammals.—The most striking feature is the almost entire absence of the higher mammalia. Mammalia may be divided into three groups—(1) Monotremes, (2) Marsupials, and (3) Eutheria. The Eutheria absent in Australia, except for bats, rats, and mice. In New Zealand there are no mammals at all; none of the various marsupials of Australia and Tasmania are present. Birds are the highest vertebrates. (1) Montremes are confined to Australia, and consist of two rare and remarkable forms, Platypus and Echidna, probably the descendants of some of those earlier developments of mammalian life, which in every other part of the globe have long been extinct. (2) Marsupials, found nowhere else on the globe, except a single family, the opossums of America. The Marsupials are wonderfully developed in Australia where they exist in most diversified forms adapted to different modes of life—some carnivorous, some herbivorous, some arboreal, some terrestrial. They are divided into two large groups—i. Diprotodontici; ii. Polyprotodontici. i. Diprotodontia.—These are rarely carnivorous. They have three incisors above and one below. They include Kangaroos, Wallaby, Tree Kangaroos of New Guinea and Queensland,

Opossums, and the Native Bear, which is absent from Tasmania. ii. Polyprotodontia.—Carnivorous and insectivorous. They are distinguished from all living mammals in that their upper incisors are 4 or 5 on either side, and in lower jaw 3. Among these are found Bandicoots and Tiger Cat of Tasmania and Australia, and Native Tiger and Native Devil of Tasmania. These are now confined to Tasmania, but have been found fossil, together with the Dingo, or Native Dog, in Tertiary beds of Australia, and contemporaneous with those extinct genera of gigantic marsupials with which Professor M'Coy has familiarized us. But neither the Native Tiger or Native Devil has ever been seen or heard of in a living state on this continent. Professor Spencer attributes their absence from the mainland to the competition of the Dingo. For in Tasmania, where they exist, the Dingo has not been. Closely allied fossil forms have been found in Europe, America, and Africa. Only last year a discovery was made in the Tertiaries of Patagonia of the remains of carnivorous marsupials closely allied to this existing pouched wolf of Tasmania, and with the same dentition. This discovery was immediately recognized as likely to considerably modify our views regarding the distribution of marsupials.

Birds.—We have nine peculiar families, but as we are looking chiefly at relations of the fauna and flora these need not be discussed. Most interesting are the Megapoda, or mound-builders. These are allied to the Curassows of Brazil. Their peculiarity consists in laying enormous eggs and burying them in loose hot sand, or in enormous mounds of leaves, sticks, earth, &c. The warmth of this fermenting mass hatches the eggs. The young birds work their way out and are able to take care of themselves. This may be an adaptation to peculiar condition of Australia in respect to prolonged droughts. In such a country confinement of parents to one spot might mean starvation. Brush-tongued parroquets, having a long tongue for extracting nectar, are allied to the parrots of South America. Also, notice distribution of order Ratitæ, or keelless birds. One division—arm with long humerus—is represented by the ostrich of Africa and Arabia, and Rhea of South America. In the second division arm has short humerus—example, Cassowary in Northern Australia and Malay Archipelago. Emu in Australia, and absent from Tasmania, where it is extinct. In New Zealand the Apteryx, the queerest and most unbirdlike of birds. It has hair-like plumage and no tail, and is nocturnal in habit. It is allied to the Cassowary and gigantic extinct Moa, which existed both in Australia and New Zealand. Closely allied forms found in London clay. The Ratitæ now living are to be regarded as remnants of a once widely distributed group, and in cretaceous rocks of North America has been found an extraordinary toothed

bird, declared by Professor March to be a carnivorous swimming ostrich. They are of immense antiquity, and probably their ancestors possessed power of flight. The other birds are in general related to old world fauna.

Amphibia.—No tailed amphibia. Distribution is at variance with that of the birds. One family is confined to Australia and South America. Two others are absent from North America, but closely allied forms are found in Australia, New Zealand, and South America.

Fish.—Among freshwater fish the most remarkable is Ceratodus, allied to Lepidosiren of Tropical America, and Protopterus of fossil Africa. These, like struthious birds, are remains of once widely distributed group. They have both gills and lung. Three groups of freshwater fish are found only in Australia and South America. This is a remarkable affinity between Australia, New Zealand, and South America.

We have now to consider the barriers that must have been overcome before Australia was stocked with its present fauna and flora. You will remember that the chief types of life originated in the north, and spread southwards, and barriers that terrestrial forms would meet with were ocean, climate, rivers, mountains, and deserts.

In considering flora we have already dealt with deserts and seas of Australia itself. But by what means did different forms arrive here in the first instance?

Australia is at present an island, but a glance at our 1,000-fathom line on map shows us a very different contour from the present. I must remind you that the line is supposed to represent the limits within which changes of land and sea have been going on during geological ages, and we see at a glance the probable former connections of Australia with Tasmania, New Zealand, and the Oriental region. When the cretaceous sea divided Western Australia from Eastern, a long, narrow belt of land extended from Cape York, or perhaps from New Guinea, to Tasmania. The western and more ancient land already possessed, in its main features, the peculiar Australian flora and ancestral forms of its strange marsupial fauna, both of which it had probably received by some former union with Asia over the Java Sea. Eastern Australian flora had been derived from three sources—Australian vegetation from across the sea, Polynesian from north and north-east, and south temperate forms from Antarctic land; and its ancestral struthious birds from New Guinea. New Zealand was now in close connection with North-Eastern Australia, and by this means Australian flora and struthious birds passed. This land connection was broken down before the mammals had passed into Eastern Australia, and later, after passage of mammals and western flora, connection with Tasmania broken.

But how did the South American affinities come about? We have two theories.

I.—Wallace considers a two-fold current of life flowed into Australia from the Old World—one current by way of Himalayas, Southern Asia, Borneo, Moluccas, and New Guinea, thence to Australia; the other current by way of the American continent, whose mountain chain has formed the most effective agent in aiding the southward migration of arctic and north temperate flora, and these travellers found a home in antarctic continents and islands, New Zealand, Tasmania, and Australia itself. The route is easily marked out. South of Cape Horn, 500 miles distant, are the Shetland Islands and Graham's Land, whence antarctic continent probably extends round South Pole to Victoria Land, and thence to Adele Land. Young Island, 12,000 feet high, is about 750 miles south of Macquarie Islands, which are outliers of New Zealand. Other islands may have existed, and barrier of the remaining seas may have been overcome by the currents in the water (which often carry plants and small animals to great distances), by the wind, and by petrels (which carry seeds, &c.) We must also remember the probable greater extension of southern lands during the warm Miocene period. When cold returned, and land again became iceclad, the plants would be crowded towards the margin of the antarctic land, and many would find their way across the sea on floating icebergs. Some forms of life are carried to great distances by floating ice-fields. The marsupials were not, he thinks, emigrants from America to Australia, but both were derived from Europe—American from a northern connection, and Australian through an Asiatic.

In an article on "The Discovery of an Australian-like Marsupial in South America," R. Lydekker writes in *Nature*, 5th May, 1892: —"Mr. Wallace's explanation that marsupials came from Europe in both cases will not, on his own showing, hold good for close resemblance between this American and the Tasmanian forms, since it is quite impossible to believe that two such similar forms could have maintained their likeness in such remote regions as Patagonia and Tasmania after having diverged from a common European ancestor as far back as Jurassic period."

II.—The second theory to account for affinity with South America is Prof. Hutton's, of New Zealand. He analyzes affinities of fauna in this way:—(1) Mammalia, character Australian; (2) birds, more nearly African than American; (3) frogs, more nearly South American than elsewhere: therefore frogs did not come by same route as birds, for where frogs could pass birds could. Map showing 1,000 fathoms will account for birds, but frogs and freshwater fish, &c., came from South America before arrival of the birds.

A vast plateau—nowhere less than 2,000 fathoms below sea

level—runs from New Guinea and Northern Australia, in easterly direction, through Fiji, Tonga Islands, to Samoa, spreading south to New Zealand and north to the Ellice, Gilbert, Marshal, Caroline, and Pelew Islands. This plateau is split into two parts by a deep, narrow channel, which runs between New Zealand and the Kermadec Islands, and between New Caledonia and New Hebrides, until it reaches almost to Torres Straits. Another plateau extends from Chili, in north-westerly direction, to the Society Islands and Cook's Island, including Juan Fernandez, Easter Island, and Paumotus and the Marquesas. Mr. Wild, of the *Challenger*, says :—" It seems as if an almost uninterrupted area of elevation crossed the whole basin of the Pacific from Patagonia towards Japan, probably about 1,500 fathoms from surface. North of this the depth is 3,000 fathoms—south, 2,600 to 2,900." Shallowest part, ridge between New Zealand and North Australia. Here, probably remains of an ancient continental area, which allowed passage of frogs, land shells, insects, and plants, but which became submerged before present group of birds came into existence. Date between Jurassic and Eocene periods.

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Proceedings of Linnean Society of New South Wales*," 2nd series, vol. viii., part 1 :—

"On the Life-Histories of Australian Coleoptera," part 1, by W. W. Froggatt. Gives brief but interesting accounts of a number of beetles, including several Victorian, with allied species.

"Revision of Australian Amarygmides," by Rev. T. Blackburn, M.A., part 2, includes several Victorian species.

In "*Transactions of New Zealand Institute*," vol. xxv., new series, 1892 :—

"Further Coccid Notes," by W. W. Maskell, F.R.M.S. Describes several new coccids, including some Victorian species.

In "*Transactions of Royal Society of South Australia*," vol. xvii., part 2 :—

"New Australian Heterocera," by O. B. Lower. Describes several new Victorian moths.

"The Gastropods of Older Tertiary of Australia," by Prof. R. Tate, F.G.S. Describes several Victorian species.

NOTES.

THE CROW.—Although almost every country has its representatives of the genus *Corvus*, which have been more or less studied, still those to be found in our Australian continent have received but little attention, and at the present time difference of opinion prevails as to whether there are one, two, or three species. Gould has described them under two headings, *Corvus Australis* (White-eyed Crow) and *C. coronoides* (Hazel-eyed Crow). In North's catalogue they are classified as *C. corone* (Raven Crow) and *C. Australis* (Common Crow). Other authorities contend that we have only one species. Up to the present I must plead guilty to a share of negligence in this matter, but with a view to arriving at a definite conclusion I have, in company with Mr. Gabriel, been making a careful examination of the large White-eyed or Raven Crow. As these birds were known to be numerous on the Werribee Park estate, application was made to Mr. Chirnside for permission to visit their habitat for the purpose of collecting specimens and making observations. The request was immediately granted, and, armed with our permit, Mr. Gabriel and I paid our dusky friends a first visit on Saturday, 9th September. Although so early in the season, we found several broods of young birds nearly able to fly. From their condition it is evident that these birds must frequently lay as early as July. In other nests eggs were found, the clutches varying from two to five in number. After some trouble a female bird was shot, but the males were more wary and had a better knowledge of gun range, or objected to being made martyrs to science, for they defied all our attempts to capture one. The specimen secured was an average specimen of the following measurements:—Length, 20 in.; wings, from tip to tip, 3 ft. 3¼ in.; third primary, 10½ in.; tail, 8 in.; bill, 2¼ in.; weight, 1 lb. 7¾ oz. These birds are decidedly the largest, are very local in their habits, and frequently spend the whole year within a very limited range. They are always in pairs, except when the young are accompanying the parents. The young of this species have a blue eye until they reach maturity. I have frequently seen a much smaller bird in large flocks, which are decidedly migratory, and generally follow the locusts from New South Wales. These birds seem to prefer insects to carrion, whilst the large or Raven Crow delights to feast on a dead sheep. I have seen samples of the Hazel-eyed Crow from Darling Downs. They were much narrower and longer than the second bird mentioned, and I am in hopes of getting some facts concerning them shortly. Perhaps some of our members may assist in working out this matter.—G. A. KEARTLAND.

VICTORIAN LAND SHELLS.—Mr. C. Hedley, F.L.S., Australian Museum, Sydney, is desirous of obtaining, for dissection, specimens of *Paryphanta atramentaria* (with animals).

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., LL.D., F.R.S.

(Continued.)

Helipterum Battii.

Herbaceous, weak, papillular- and somewhat lanuginous-pubescent; leaves distant, of thin texture, from lanceolar- to narrow-linear, almost flat or crisped, the floral leaves much abbreviated; headlets of flowers small, nearly all spicately arranged, singly approaching each other or some in pairs; involucre almost semiellipsoid, rayless, the constituting bracts not numerous, all sessile, the lowest broad-lanceolar and largely greenish, the next more scarious; flowers few; tube of the corolla very thin till suddenly dilating; anthers somewhat exserted; stigmas slender, with much thickened terminations; achenes densely silky, some of the inner imperfectly developed; pappus-bristlets white, 12–14, gradually less conspicuously plumous at their upper portion.

Between Dundas-Hills and Lake-Lefroy; J. D. Batt.

Probably not tall. Leaves seldom above one inch long, the lower narrowed into a conspicuous petiole, the upper floral leaves bract-like. Headlets hardly half an inch long; the upper part of their corollas emerging. Fertile achenes fully half as long as the pappus.

Allied to H. Charsleyæ, but the involucral bracts are acute or even acuminate and partially green-coloured, the corollas are more widened towards their summit, and the pappus is pure-white. The involucre brings this species near the Ixiolaenas.

RECORD OF PLANTS, NATURALIZED IN THE COLONY OF VICTORIA SINCE 1889. (52 species).

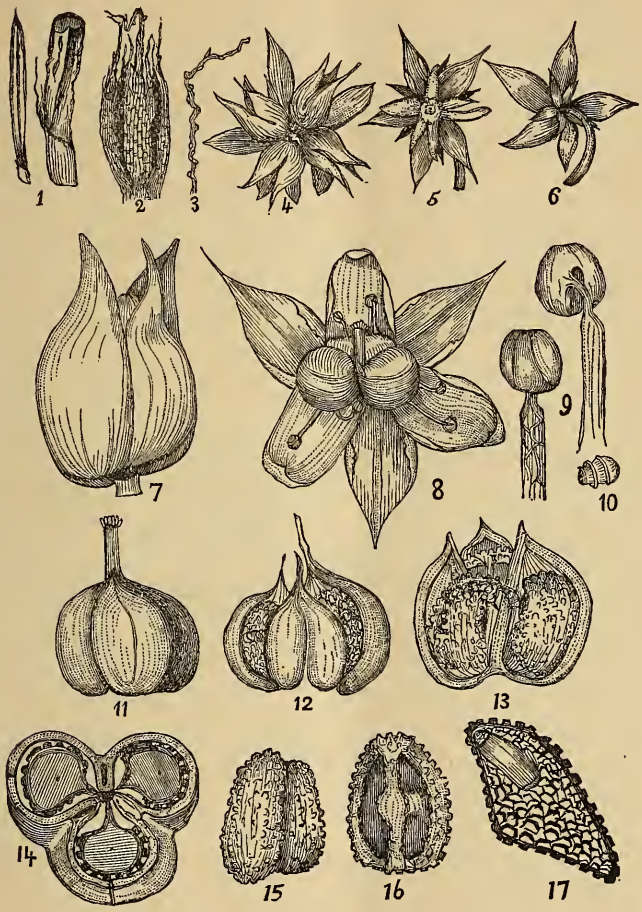
Ranunculus arvensis, Linné ...	...	E.	As.	Afr.	—
Glaucium luteum, Scopoli ...	...	E.	As.	Afr.	—
Papaver hybridum, Linné ...	...	E.	As.	Afr.	—
Cheiranthus cheiri, Linné ...	...	E.	—	—	—
Lunaria inodora, Lamarck ...	...	E.	—	—	—
Lepidum campestre, R. Brown	...	E.	As.	Afr.	—
Hypericum perforatum, Linné ...	...	E.	As.	Afr.	—
Viola odorata, Linné ...	...	E.	As.	Afr.	—
Euphorbia Lathyris, Linné ...	...	E.	As.	Afr.	—

Gypsophila perfoliata, Linné ...	...	E.	As.	Afr.	—
Tunica velutina, Fisher and Meyer	...	E.	As.	Afr.	—
Saponaria vaccaria, Linné ...	...	E.	As.	Afr.	—
Cerastium vulgatum, Linné ...	...	E.	As.	Afr.	—
Cerastium quaternellum, Fenzl	...	E.	—	Afr.	—
Claytonia caulescens, F. v. M ...	...	—	—	—	Am.
Amarantus Blitum, Linné ...	...	E.	As.	Afr.	—
Emex australis, Steinheil ...	...	—	—	Afr.	—
Polygonum Convolvulus, Linné	...	E.	As.	Afr.	—
Psoralea pinnata, Linné ...	...	—	—	Afr.	—
Medicago Arabica, Allioni ...	...	E.	As.	Afr.	—
Trifolium glomeratum, Linné ...	...	E.	As.	Afr.	—
Scorpiurus sulcatus, Linné ...	...	E.	As.	Afr.	—
Oenothera tetraptera, Cavanilles	...	—	—	—	Am.
Caucalis nodosa, Scopoli ...		E.	As.	Afr.	—
Inula graveolens, Desfontaines	...	E.	As.	Afr.	—
Hedypnois Cretica, Willdenow	...	E.	As.	Afr.	—
Senecio vulgaris, Linné ...	...	E.	As.	Afr.	—
Anthemis arvensis, Linné ...	...	E.	As.	Afr.	—
Chrysanthemum Parthenium, Hoffmann	...	E.	As.	Afr.	—
Lysimachia vulgaris, Linné ...	...	E.	As.	Afr.	—
Nolana prostrata, Linné ...	...	—	—	—	Am.
Echium violaceum, Linné ...	...	E.	As.	Afr.	—
Moluccella laevis, Linné ...	...	E.	As.	Afr.	—
Nicandra physaloides, Gaertner	...	—	—	—	Am.
Solanum marginatum, Linné, *fil*	...	E.	As.	Afr.	—
Veronica arvensis, Linné ...	...	E.	As.	Afr.	—
Convolvulus arvensis, Linné ...	...	E.	As.	Afr.	—
Mimulus moschatus, Douglas ...	...	—	—	—	Am.
Linaria Elatine, Miller ...	...	E.	As.	Afr.	—
Verbena Bonariensis, Linné ...	...	—	—	—	Am.
Salvia verbenacea, Linné ...	...	E.	As.	Afr.	—
Amsinkia angustifolia, Lehmann	...	—	—	—	Am.
Lavandula Stoechas, Linné ...	...	E.	As.	Afr.	—
Stachys arvensis, Linné ...	...	E.	As.	Afr.	—
Homeria miniata, Sweet ...	...	—	—	Afr.	—
Juncus capitatus, Weigel ...	...	E.	—	Afr.	—
Asphodelus fistulosus, Linné ...	...	E.	As.	Afr.	—
Lagurus ovatus, Linné ...	...	E.	As.	Afr.	—
Festuca rigida, Mertens and Koch	...	E.	As.	Afr.	—
Bromus scoparius, Linné ...	...	E.	As.	Afr.	—
Polypogon Monspeliensis, Desfontaines	...	E.	As.	Afr.	—
Psamma litoralis, Beauvois ...	...	E.	As.	Afr.	Am.

BARTLINGIA SESSILIFLORA, F. v. M.,

In papers of the Royal Society of Tasmania, 1877, p. 116.

Drawn by J. P. Eckert.



BARTLINGIA SESSILIFLORA, F. v. M.

1, a leaf and portion of branchlet with stipule; 2, a stipule expanded; 3, a fringe of the stipule; 4 and 5, clusters of flowers; 6, a flower with bracts; 7, a flower unexpanded; 8, a flower expanded; 9, stamens; 10, pollen grains; 11, pistil; 12, fruit; 13, longitudinal section of fruit; 14, transverse section of fruit; 15, seed; 16, longitudinal section of a seed; 17, part of a seed, showing embryo. All enlarged, but to various extent.

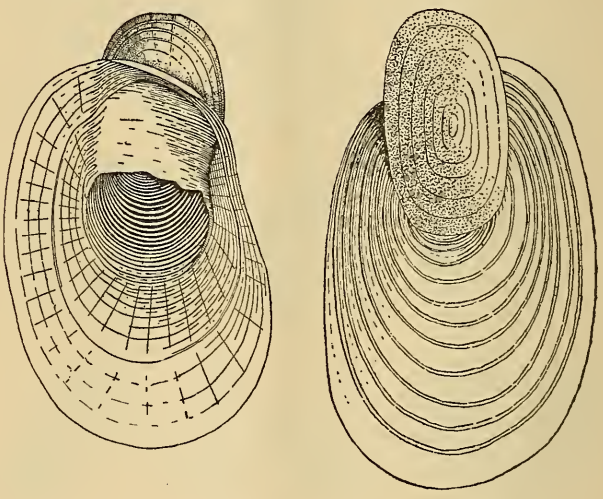
Drawn by J. P. Eckert.

GUNDLACHIA: A VICTORIAN DESIDERATA.

By C. Hedley, F.L.S., of the Australian Museum, Sydney.

Lately I have had occasion to study a most interesting genus of freshwater shells, Gundlachia, in which a tiny Ancylus, or freshwater limpet, seems to be stuck aslant upon the summit of another.

This genus has two species in Tasmania, one of which extends to South Australia. It is quite likely, therefore, that it may also turn up in Victoria. To enable collectors to recognize it I have had engraved a couple of sketches that I drew for the purpose. The left hand figure shows the interior of *G. Petterdi*, the right the exterior of *G. Beddomei*. Both are much magnified.



They live in shallow, stagnant pools, and cling to water weeds, dead sticks, and leaves. A casual glance would most likely mistake it for Ancylus, which it much resembles in size and colour.

For further details the reader is referred to a memoir about to appear in the "Proceedings of the Linnean Society of New South Wales."

Should any of the members of the club succeed in detecting this genus in their colony, I should be glad to hear of the circumstance.

Field Naturalists' Club of Victoria.

President:

MR. H. T. TISDALL, F.L.S.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor, Mr. F. G. A. Barnard, Kew.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

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The Author of each article is responsible for the facts and opinions he records.

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THE

Victorian Naturalist.

Vol. X.—No. 10. JANUARY, 1894. No. 122.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 15th January, 1894, the vice-president (Mr. F. G. A. Barnard) occupied the chair, and upwards of 100 members and visitors were present. Among the latter were Mr. B. Spencer, president of the Natural History Society of Bradford, England, who, on being introduced to the meeting, gave some interesting particulars as to the work of his Society; and Mr. H. Barnard, one of the well-known family of naturalists of North Queensland.

REPORT OF EXCURSION.

A report of the excursion to Beaumaris on Saturday, 16th December, 1893, was received from the leaders, Mr. T. S. Hart and the Rev. W. Fielder.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that the ordinary monthly meeting for practical work was held on 18th December, when a second demonstration on the Crayfish was given by the Rev. W. Fielder. The alimentary, circulatory, reproductive, and nervous systems were dealt with in detail, and some very good dissections of these systems were made. Regret was expressed that the course in zoology was to conclude with this type, and the hope was expressed that at the termination of the proposed series in botany another course in zoology might be arranged. Taken as a whole, the present course has been a successful one, but it must be remembered that the types studied and the work done can only be regarded as suggesting methods and means for further investigations at home. It is impossible in two short meetings to cover all the ground necessary for a complete study of the anatomy of such a form as the Crayfish, but it is held that sufficient knowledge is gained to enable an inquirer to prosecute successful work in private. The result of such meetings as these cannot be gauged by the actual attendance and work done in the class-room. It will, however, be felt in the increased enthusiasm which practical contact with such methods of study is, sooner or later, sure to engender.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. C. Morley was duly elected a member of the Club.

OFFICE-BEARERS.

The chairman reported that Mr. C. Frost, F.L.S., had been elected to fill the vacancy on the committee caused by the resignation of Mr. D. Best.

On the motion of Mr. C. Frost, seconded by Mr. G. Coghill, it was unanimously resolved—"That this meeting receives with deep regret the announcement of Mr. Best's retirement from the committee with which he has been associated almost without intermission since the foundation of the Club."

There being no other nomination, Mr. H. P. C. Ashworth was declared duly elected to fill the position of hon. secretary.

The chairman then announced that Dr. A. Dendy, M.Sc., had resigned his position as one of the vice-presidents, and invited nominations for the vacant office, when that of Professor W. Baldwin Spencer was the only one received.

At the request of the chairman, Baron von Mueller here made an interesting presentation to the retiring hon. secretary, the Rev. W. Fielder, as recorded in a subsequent page.

REPORT OF ANNUAL EXCURSION.

The report of the expedition to the Furneaux Group, Bass Straits, by Mr. J. Gabriel, F.L.S., was then read by Mr. J. F. Bradly, and illustrated by limelight views by Messrs. Campbell and Ashworth. The party visited about twenty islands of the Group, their head-quarters being on Flinders Island. They were the first to ascend Mt. Strzelecki, the highest point in Bass Straits, from which a magnificent panoramic view was seen, embracing about forty islands and a long stretch of Tasmanian coast. While cruising around in a cutter they touched at numerous islets, where seabirds were breeding, and secured photographs of their haunts, those of the Gannet rookery on Cat Island being especially interesting. The half-caste settlement on Cape Barren Island and the extensive Mutton Bird rookery on Chappell Island were also visited.

Notes of the ornithological and oological work done were then read by Mr. A. J. Campbell, F.L.S., which will appear in an early *Naturalist*.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. H. P. C. Ashworth.—Mounted birds and bird skins, birds' eggs, and photographs from Furneaux Group. By Mr. A. J. Campbell, F.L.S.—Birds' eggs and photographs from Furneaux Group. By Mr. D. Le Souëf.—Egg of Yellow-tinted Fly-catcher (*Micræca flavigaster*), new to science; egg of Northern Sphecotheres (*Sphecotheres flaviventris*); egg of Spalding's Orthonyx (*Orthonyx Spaldingii*). By Mr. A. Coles.—Pair of Little Water Crake (*Porzana palustris*), with nest and eggs, from Somerville;

nest and eggs of the Spotted Water Crake *(Porzana fluminea)*, from same locality; also, a Buprestid Beetle from Swan Hill. By Mr. H. R. Hogg.—Eggs of lizard. By Rev. W. Fielder.—Egg-case of cuttlefish and mounted sections of embryos, *Argonauta orizata* (female, with egg-case), and mounted sections of embryos; also, specimen of *Aneites graffer* from New South Wales, forwarded by T. Steel, F.C.S. By Baron von Mueller, K.C.M.G. —The variety Shepherdiana of *Grevillea asplenifolia* (Knight) from Cole River, near Jervis Bay, where it was discovered by a son of Mr. P. L. C. Shepherd; some of the leaves exceed a foot in length, though their greatest breadth is only about a quarter of an inch, and on the surface much beset with minute hairlets; also, *Helipterum Battii*, from near Lake Lefroy, collected by J. D. Batt, new to science; *Soliva sessilis*, from near Port Fairy, new as an introduced plant for Victoria, collected by J. B. Williamson. By Mr. J. E. Dixon.—Coleoptera collected recently, viz. :—*Piesarthrius marginellus* (Hope), *Hesthesis cingulata* (Kirby), *Distichocera par* (Newman), Strongylurus sp. (rare), *Stigmodera variabilis* (Don.), *S. apicalis;* also, rare butterfly *(Hypochrysops delicia)*. By Mr. C. French, jun.—Nest and eggs of *Petrœca phœnicea*, from Dandenong; eggs of *Mirafra horsfieldii*, from Wimmera. By Mr. T. S. Hart.—Stichensides and dyke-stones (felspar-porphry), from the Grampians. These dykes are common in the sandstone at Hall's Gap, but do not appear to have been recorded.

After the usual *conversazione* the meeting terminated.

PRESENTATION TO THE REV. W. FIELDER.

At the January meeting of the Club, an interesting presentation was made to the Rev. W. Fielder, in recognition of his services as hon. secretary. Baron von Mueller, K.C.M.G., who attended at considerable risk, suffering as he was from indisposition, made the presentation on behalf of the members, and asked Mr. Fielder to accept, as a token of their appreciation, a valuable microscope, which was accompanied by an illuminated address, kindly executed by Mr. Ernest Anderson, and worded as follows :—

To the Rev. W. Fielder.

The members of the Field Naturalists' Club of Victoria desire to place on record their appreciation of the manner in which you have carried out the duties of hon. secretary during the past three years.

Owing largely to your energetic and persistent efforts, the Club has not only been able to maintain its character and work during a period of great depression, but has developed fresh channels of usefulness in the meetings for practical work.

It is with great regret we learn that circumstances compel you to relinquish the position you have filled so worthily and with such benefit to the Club, and can assure you that your valuable services will long be remembered.

In conclusion, we wish to express our hopes for your welfare and success

in whatever sphere of work you may undertake, and beg your acceptance of the accompanying microscope as a slight token of the regard and esteem in which you are held by the members.

Signed on behalf of the Club,

HENRY THOS. TISDALL,

15th January, 1894. President.

In acknowledging the presentation, Mr. Fielder expressed the utmost gratification at the form the presentation had taken, and traced any enthusiasm in his work to his association with so many active members.

THE BEGINNINGS OF LIFE.

THE following are the most important paragraphs of Dr. Cherry's paper on the above subject, read before the Club on the evening of 14th October :—

INTRODUCTION.

In giving a single paper on such a subject as "The Beginnings of Life," I think it best to follow a somewhat different plan from what I should have done had this been the first of a series of lectures dealing with the subject. In the latter case one might have gone into the facts in such a way as to have made the course an introduction to the study of biology. But this evening all we can hope to do is to select a group of facts every here and there, and to hang from these a few pictures which will, I hope, give you a view of the first principles which underlie the problems of the beginnings of life.

THE UNITY OF PROTOPLASM.

The time has long since passed when it would have caused any surprise to hear a lecturer declare that the ground substance of which all living beings are built up is very much the same. Very much the same, whether it exist in the form of a tiny spec only discernible with the microscope, or the tallest of our giant gum-trees, or the great whale, or man who has dominion over them all. As illustrating how closely all living things are linked together, I may mention one or two points which bear upon man's relations to the lower animals. Within recent years we have gone a step further than cooking and eating them : we now appropriate parts of them direct, without the intermediate stages of digestion and assimilation. Suppose that from disease or injury a man has lost a piece of skin or bone. We may take a piece of skin or bone from one of the domestic animals, a dog or a cat for instance, and transplant it; and if all the circumstances are favourable the transplanted piece will grow, and ultimately become a living part of the living human being. Take another instance. In the front of the neck we have on each side of the windpipe a glandular body about as large as two of our fingers. It is called the

thyroid gland, and until the last few years was looked upon as having at the most something to do with the elaboration of the blood; but its function was not known, and it was regarded as one of those parts, of which we still retain a few in our bodies, the use or purpose of which is not very apparent. In fact, many physiologists looked on it as a useless organ. Now we have evidence, however, that it has a most important function in preserving the nutrition of the nervous system. When it is lost through disease or other cause the person becomes enfeebled in his mind, and ultimately demented. At the same time evidence of grave disease occurs in other parts of the body, and the case runs slowly but inevitably to a fatal end. The treatment at present adopted, with very considerable success, is to supply the affected persons with the thyroids of other animals, chiefly the sheep. Sometimes she is merely fed to a very large extent on them. In other cases the fresh juice of the sheep's thyroid is injected into the blood. But an equally successful, but at the same time the most difficult, method of treatment is to transplant a portion of a sheep's thyroid under the skin of the diseased person. If this is successfully done the part so transplanted grows, and performs the functions of the diseased organ, the course of the disease is stopped, and the affected person in a number of instances recovers.

ESSENTIAL CHARACTERS OF PROTOPLASM.

Now let us see what are the chief of the characteristics common to protoplasm, by virtue of which we can understand in some degree how it forms a united whole of itself—sharply cut off from all other substances with which we are acquainted. Protoplasm forms the whole of the simplest and least complicated forms of living things, but in the course of growth and development it becomes "*differentiated*," as it is called; that is, various parts originally the same become different, usually in order to subserve different purposes in the economy of the one living whole. But of simple undifferentiated protoplasm it may be said that it has in the first place a fairly definite chemical composition. It consists almost exclusively of a substance called albumin, a substance which we may see in a state of nearly perfect purity in the white of an egg. When dead and analyzed this is found to consist of C, O, N, and H in fairly constant proportions. When alive it always has also a quantity of water bound up with it in the closest relationship, and there are traces of S, P, and Ca. and other elements, apparently also in chemical combination with it; so that, although dead protoplasm may consist largely of albumin, it is highly probable that living protoplasm is very much more complex. We have reason to think that albumin is a chemical substance that has at least a thousand atoms in each of its

molecules, and possibly protoplasm may have many hundred times as many.

Secondly, living matter holds a very remarkable relation to all the rest of the known universe. It takes up dead materials from that dead universe and converts them into its living self, while at the same time portions of its living self are being continually separated as dead matter, and returned to the dead universe. These latter changes are to a very large extent processes of oxidation, the parts thrown off being parts of the living protoplasm which have united with the dead O, and are separated chiefly as dead CO_2. Thus life is a continual series of changes, the arrest of which means the death of the whole, except in the cases of spores and seeds which have become specially resistant to external influences. In them life may remain dormant or resting for almost idefinite periods provided it is exposed to no conditions which are altogether incompatible with its existence—such as complete drying. What these conditions are will be mentioned later on. Meanwhile, we may notice that the only proof we have of the fact that in such cases life is present, although resting, is the second fact that, under favourable conditions, its active manifestations will be resumed. Otherwise, we cannot tell whether life is present or not.

Now while all living matter is thus being continually broken-up and changed by the union of the dead oxygen with some of the molecules of the living protoplasm, and the separation of these molecules as dead CO_2—changes which we comprehend in the case of the higher animals under the name of respiration—provision is also made for its continual renewal. While respiration is the process by which protoplasm is being broken up, digestion and assimilation are the process by which it is being continually renewed. Dead materials are taken up as food, and are incorporated as part of the living whole. If this process goes on faster than the former, the body grows. If slight but permanent changes take place at the same time in the protoplasm, the process which is called differentiation or development ensues.

Thirdly, living matter undergoes a series of changes which have a tendency to follow one another in regular succession. Periods of activity alternate with periods of rest. These are seen in the higher animals, which, after all, are aggregates of cells, in sleep and waking, in the tired muscle and the weary brain, in the contraction and relaxation, the systole and diastole, of the heart; in the bare boughs of winter and the verdure of smiling spring. But the most remarkable of all these periodical changes is that by which a portion of the living protoplasm becomes detached and starts off on a new and separate existence on its own account. For the most part it inherits all the peculiarities of that from which it has sprung; in particular, it exhibits these three great

characteristics common to all protoplasm : it agrees with them in life history, in chemical composition, and in growth and nutrition. It runs through a similar series of changes, and passes on the gift of life to a similar portion of itself.

I have said that the continual waste was being as continually made good by a process of renewal and repair ; but the two do not completely balance. Had they done so the *individual* might have enjoyed a perpetual youth, but it is difficult to see how the course of the great stream of life could have been ever *onward*. After a time waste predominates over repair, and the individual slowly withers, until at last waste has so far obtained the upper hand that life is no longer possible so far as the protoplasm is concerned. And then the individual dies. In the natural sequence of events, the limit of the life of the various tissues of which the body is composed varies greatly. These tissues have all been derived from the one common protoplasm, but they resist the wear and tear of life in varying degrees. Some parts die and disappear in childhood, others in adult life ; and as old age creeps on the failure in the vigour of the tissues is apparent almost everywhere. The teeth decay and fall out ; cartilages and sinews become bony from the deposition in them of earthy salts ; the blood vessels suffer a like change, and even the seeing eye grows dim, and the understanding brain fails to perceive. It is conceivable that this gradual decay would have gone on till at last death took place by imperceptible degrees, but the living frame is such a complicated machine that death is always more or less sudden and violent. One part breaks down and throws all the rest out of gear. Life ceases not because every molecule and cell is worn out, but because one part has given way, the activity of which was essential to the preservation of the life of the whole. Before leaving this part of the subject—where the end meets the beginnings of life—let us notice how change is the very first and most fundamental law of all living matter. Astronomers tell us that change is also the law of the whole universe ; that the planets and the sun are growing cold ; that the stars, apparently fixed and changeless for ever, are slowly changing too. Geologists tell us that, as far as the surface of the earth is concerned, a few million years will completely alter the face of the dry land. And as to the ocean, what shall we say of it ? "Time writes no wrinkles on thine azure brow" may be poetry, but it is certainly not science. Yet all these things are fixed and unchangeable compared to life : with it to stand is to die, it *must* change or it ceases to be. And what is more, life is no passive condition. Living protoplasm is matter, so to speak, in a state of unstable equilibrium ; its tendency is always to fall ; but it has within itself forces which are able for a time successfully to defy its adversaries. It maintains its fortress, though so far as we know this is but a solitary point in

the midst of a dead universe, set upon on every side by blind forces. And even in death it is triumphant, for, before it has returned to that dead universe, it has handed on the privilege of living to a portion of itself, and so the struggle goes on throughout the ages. I have said life is no passive condition. Its surroundings call forth ceaseless activity, otherwise it would die. The struggle for existence is a genuine fact: it is one at least of the great factors which have determined the course of evolution. The long struggle from the dawn of life up to man has ever been upward and onward. Change and decay may be the universal law of protoplasm, and protoplasm forms the physical basis of life, including man and all his activities—physical, intellectual, and moral—but written over change and decay there is one other word which illumines the whole page, and that one word is *Onward.*

THE STRUGGLE FOR EXISTENCE.

A bacillus has almost incredible prolificness, if the surrounding circumstances such as food, moisture, and warmth are favourable. Take a few drops of a fluid containing a couple of hundred organisms: in 24 hours the number has risen to 5,000; in 48 to 20,000, and on the fourth day there are millions of them. It has been found that a bacillus will divide in one hour, in the next hour these two have become four, in three hours eight, and so on. In three days, supposing this rate were maintained—that is, supposing their environment were completely favourable—they would have increased to 4,772 billions, and this mass would weigh 7,500 tons. A few days' multiplication at this rate would equal the earth; but they *don't*—some survive and others die. Now, in fluids, when the organisms can move about freely, and successively reach fresh parts of the fluid, they will continue to multiply till they are brought to a standstill by circumstances to which I will refer in a moment; but on the solid, after growing rapidly for a day or two, the colonies soon cease to increase in size. And the reason for this is not far to seek. Those on the surface are in contact with the air, and shut off from the food, those below are shut off from the air, and in contact with the food. We know that some grow best in contact with the air, others away from it. Those on the edges are probably prevented from multiplying by the accumulation of chemical products in those behind them. If you plant some yeast in a fluid containing sugar and other substances, so that it is under as favourable circumstances as possible for its growth, that it will continue to multiply and grow, causing fermentation and producing alcohol, until the alcohol (its own product) reaches about 17 per cent. At this point its growth ceases, although the temperature may be right, and there is plenty of sugar left in the

solution, and it will remain at rest till some of the alcohol is taken off, or until the fluid is diluted, so as to reduce the percentage of alcohol. Now, we know that many organisms produce chemical compounds just in the same way as the yeast produces alcohol. We have reason to think that they all do so. Whatever may be the cause, it is evident that there must be something in their surroundings which checks the rate of increase in the bacteria, and those who can most successfully overcome that something have the best chance of survival.

INFLUENCE OF ENVIRONMENT ON BACTERIA.

It has long been known that the nutrient medium and the temperature at which bacteria are grown have a marked influence on the appearances of the growing colonies. Thus an organism which will produce abundance of pigment when grown on a potato may produce little or none on gelatine. Some are exceedingly difficult to cultivate upon any artificial medium, of which a notable example is found in tubercle. It is to this organism that I wish to call attention in the first place. Most of you are, doubtless, aware that the tubercle bacillus is a short, thin rod, about one-third of the diameter of a red blood corpuscle in length. For a long time no artificial culture medium could be found till Koch hit upon solid blood serum. Subsequently nutrient agar-agar, or broth, to which 6 per cent. of glycerine has been added, has become the usual medium on which it is grown. It flourishes best at about blood heat; indeed, until lately, it was supposed to grow only at that temperature, and does not flourish vigorously, compared to other organisms, even at that. If, however, the temperature be lowered, and after a few weeks' incubation a second tube be inoculated from the growth which has taken place in the first one, this second crop will be more vigorous than the first, and a third, fourth, and subsequent generations will each display additional vigour, even if the temperature be gradually reduced. Similarly, a change may be produced by varying the medium, until at last a very free growth may be obtained on potato kept at the ordinary temperature of the air—say, 50°–70° F. An examination of the properties of such a growth will, however, reveal considerable changes from those of the original growth. "Earlier generations of such cultivations produce, when inoculated, typical tubercular nodules with extreme and characteristic rapidity, but after several generations of such pure cultivations have been made in these glycerine media, the virulence may become distinctly diminished, although the growths are as luxuriant as or even more luxuriant than ever." At the same time many of the bacilli exhibit marked change of form. On the other hand, cultivations which have been carried

on through 100 generations on solid blood serum apparently retain all the properties of their original stock, and produce general tuberculosis in the usual way when inoculated. Somewhat analogous phenomena are seen in bacilli obtained from various animals. For instance, tubercle bacilli taken from a human patient and inoculated into a cow will set up "acute general tuberculosis," the tubercles and the bacilli being found in nearly all the organs and tissues of the body. But bacilli taken from a case of bovine tuberculosis, set up almost invariably a special bovine form of the disease, in which the lungs, and especially the pleura, are the parts attacked, and, microscopically, the new formations have a very different appearance from ordinary human tubercles.

In the case of the tetanus bacillus, that which causes lock-jaw, the virulence of the culture is kept up only when they are grown in the absence of oxygen. The presence of this element destroys the power of even pure cultivation of the organism after a very short time. Many other facts of a somewhat similar character are known, and they appear to throw some considerable light on the question of the "Origin of Species," for the differences in organisms which can thus be artificially produced are quite as great as those which are held to differentiate one species from another. The protoplasm of these lowly forms of life seems to be very plastic. When inoculated under conditions which are not absolutely favourable to their growth, those best adapted to the conditions survive and grow. The second inoculation will contain a larger proportion of these, and so in the course of a few generations the descendants may have varied greatly from the original stock.

NOTES ON NUYTSIA FLORIBUNDA,

By Mr. W. Webb, of King George's Sound (furnished in response to some questions from Baron von Mueller).

We can find thousands of what appear at first sight to be seedlings, but on tracing the roots we always find them growing from the roots of parent trees, and therefore we think these supposed seedlings are nothing more or less than suckers. Up to the present we have not been able to find the roots of the tree attached to anything; they shoot out in all directions and for great distances, but never penetrate the soil deeply, but are always found some few inches below the surface; in this manner they may—and probably do—receive their sustenance from decaying vegetable matter, such as the roots of the numerous

species of shrubs, amongst which Nuytsia usually occurs. As this plant has a pretty wide range in Western Australia, would it be worth while to ascertain, what kinds of trees and shrubs occur in every locality, where Nuytsia is found? So far as my memory serves me, I feel certain that a great difference will be found in the species of plant-life at different places. My own opinion is, that Nuytsia is an *independent tree*, but that it requires certain conditions in the soil, which can only be given to it by certain other species of plants. However, I have nothing to advance in proof of the above, except that I have never found the roots attached to any other tree or to the roots of other plants.

UNRECORDED REGIONAL INDICATIONS OF VICTORIAN PLANTS.

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folia, S.W.; Pimelea collina, S.W.; P. spathulata, S.W.; P. hypericina, S., E.; Coprosma Billardieri, S.W.; Opercularia hispida, E.; Passiflora connabarina, N.E.; Brachycome stricta, N.W.; Calotis microcephala, N.E., E.; Aster megalophyllus, E.; A. pannosus, N.W., S.; A. dentatus, E.; A. lepidophyllus, N.W., S.W., S., N.E., E.; A. microphyllus, N.E., E.; A. glutescens, S.; A. terefolius, S.; Podolepis rutidochlamys, N.W.; Leptorrhynchos tenuifolius, N.E.; Helipterum læve, N.W.; H. exiguum, N.E.; Helichrysum adenophorum, S.W.; Cassinia lævis, S.; C. Theodori, N.W.; Ammobium alatum, E.; Angianthus tenellus, S.W.; A. pleuropappus, N.W.; A. tomentosus, S.W.; Leucophyta Lessingi, N.W.; L. Drummondii, N.W.; Glossogyne tenuifolia, E.; Cotula alpina, E.; Lobelia pedunculata, N.W., E.; Candollea perpusilla, N.W.; Goodenia hederacea, E.; G. pusilliflora, N.W.; Gentiana quadrifaria, E.; Anthocercis albicans, N.E.; Stemodia Morgania, S.W.; Glossostigma Drummondii, N.W.; Polypompholyx tenella, N.W.; Prostanthera phylicifolia, E.; P. saxicola, E.; Westringia longifolia, E.; W. glabra, E.; Newcastlia Dixoni, N.W.; Verbena officinalis, N.W.; Myoporum viscosum, N.W.; Wittsteinia vacciniacea, S.E.; Styphelia humifusa, N.W.; S. microphylla, E.; S. esquamata, E.; S. costata, N.W., S.W.; S. appressa, E.; S. Woodsii, N.W.; Brachyloma daphnoides, N.W.; Dipodium punctatum, N.W.; Thelymitra fusco-lutea, S.W.; T. epipactoides, S.; Diuris alba, S., N.E.; Pterostylis pedaloglossa, S.; P. pedunculata, N.E.; P. reflexa, N.W.; P. longifolia, N.W.; P. furcata, S., E.; P. vittata, N.W., S.W.; P. grandiflora, S.; Acianthus caudatus, E.; A. exsertus, N.W., N.E., E.; Eriochilus fimbriatus, N.W.; Caladenia congesta, S.; C. diphylla, S.; Sisyrinchium pulchellum, E.; Dianella cœrulea, E.; D. longifolia, N.W.; Thysanotus tuberosus, N.W.; T. dichotomus, S.W.; Tricoryne simplex, E.; Xerotes juncea, N.W.; X. glauca, N.W.; Wolffia Michelli, S.; Triglochin calcitrapa, N.W.; Potamogeton lucens, E.; Ruppia maritima, N.W.; Althenia australis, N.W.; Philhydrum lanuginosum, S.W.; Juncus homalocaulis, N.W.; Eriocaulon Smithii, E.; Leptocarpus Brownii, N.W.; Lepidobolus drapetocoleus, N.W.; Kyllingia intermedia, E.; Cyperus eragrostis, E.; Fimbristylis ferruginea, E.; Schœnus ericetorum, E.; Lepidosperma carphoides, N.W.; Cerex tereticaulis, E.; Panicum Crus Galli, E.; Oplismenus compositus, S.; Zoysia pungens, S.W.; Andropogon affinis, N.W., N.E., E.; A. pertusus, N.E.; Sporobolus pallidus, N.W.; S. Indicus, E.; Danthonia setacea, N.W.; Diplachne loliifornis, N.E., E.; Pilularia globulifera, N.W., S.W.; Isoetes Drummondii, S.; Psilotum triquetrum, S.W.; Adiantum diaphanum, E.; Pteris comans, S.W.; Aspidium molle, S.W.; A. tenerum, E.; Hypolepis tenuifolia, E.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part VIII.

254. E. GRATIOSATA, Gn. (*Nemoria gratiosata*, Gn., ix., 351, pl. xvii., i.; *Iodis gratiosata*, Meyr., Proc. Linn. Soc. N.S.W., 876, 1886).
Melbourne, Apsley.

255. E. CENTROPHYLLA, Meyr. (*Iodis centrophylla*, Meyr., Proc. Linn. Soc. N.S.W., 880, 1886).
Melbourne.

*256. E. CARENARIA, Gn. (*Chlorochroma carenaria*, Gn., ix., 366; *Iodis carenaria*, Meyr., Proc. Linn. Soc. N.S.W., 881, 1886).
Gisborne.

Mr. Butler (Tr. Ent. Soc. Lond., p. 435, 1886) thinks this species was described on a poor specimen of *submissaria*. I have, however, received from Mr. G. Lyell, jun., of Gisborne, a specimen which agrees in every particular with the description supplied by M. Ragonot, of the Paris Museum, to Mr. Meyrick, and subsequently published as above. The specimen was beaten from *Acacia decurrens*.

257. E. SUBALPINA, Lucas (*Iodis subalpina*, Lucas, Proc. Linn. Soc. N.S.W., ? 1889).
Fernshaw.

*258. E. SUBMISSARIA, Walk. (*Geometra submissaria*, Walk., 529; *Chlorochroma carenaria*, *ib.*, 522 (*nec* Gn.); *Iodis submissaria*, Meyr., Proc. Linn. Soc. N.S.W., 882, 1886).
Melbourne, Gisborne.

*259. E. DICHLORARIA, Gn. (*Chlorochroma dichloraria*, Gn., ix., 365, pl. vi., 8; *Iodis dichloraria*, Meyr., Proc. Linn. Soc. N.S.W., 884, 1886).
Gisborne, Melbourne, Beaufort.

*260. E. CADMARIA, Gn. (*Chlorochroma cadmaria*, Gn., ix., 365; *C. vulnerata*, Butler, Ann. Mag., 1882, 91; *Iodis cadmaria*, Meyr., Proc. Linn. Soc. N.S.W., 887, 1886).
Gisborne, Melbourne, Beechworth.

*261. E. SEMICROCEA Walk. (*Geometra semicrocea*, Walk., 528; *Chlorochroma intermixta*, *ib.*, 563; *C. decissima*, *ib.*, 564; *Iodis semicrocea*, Meyr., Proc. Linn. Soc. N.S.W., 887, 1886).
Gisborne, Bairnsdale, Melbourne.

*262. E. ALBICOSTA, Walk. (*Geometra albicosta*, Walk., 529; *Iodis albicosta*, Meyr., Proc. Linn. Soc. N.S.W., 888, 1886).
Gisborne.

Meyrick, when writing on the genus, had not seen this species, except the type, which he supposed was from East Australia. I have taken two specimens at Parkside, South Australia.

263. E. BUPRESTARIA, Gn. (*Phorodesma buprestaria*, Gn., ix., 371, pl. vii., 4; *Iodis buprestaria*, Meyr., Proc. Linn. Soc. N.S.W., 890, 1886).
Melbourne.

*264. E. BOISDUVALARIA, Le G. (*Geometra boisduvalaria*, Le G., Rev. Zool., 1841, 257; *Chlorodes mirandraria*, Gn., ix., 379, pl. v., 7; *Iodis boisduvalaria*, Meyr., Proc. Linn. Soc. N.S.W., 892, 1886).
Melbourne.

265. E. INSPERATA, Walk. (*Thelassodes insperata*, Walk., 555; *Iodis insperata*, Meyr., Proc. Linn. Soc. N.S.W., 895, 1886).
Melbourne.

AGATHIA. Gn.

HELIOMYSTIS. Meyr.

266. H. ELECTRICA, Meyr. (Proc. Linn. Soc. N.S.W., 901, 1886).
(Melbourne) Victoria.

CRYPSIPHONA. Meyr.

267. C. OCCULTARIA, Don. (*Phalæna occultaria*, Don., Ins. N. Holl., 36; *Hypochroma occultaria*, Gn., ix., 281; *Crypsiphona occultaria*, Meyr., Proc. Linn. Soc. N.S.W., 903, 1886).
Melbourne (South), Springvale, Gisborne, &c., &c.

PSEUDOTERPNA. Hb.

I have followed Meyrick in adopting this, the earlier name.

268. P. WILSONI, Feld. (*Hypochroma wilsoni*, Feld., pl. cxxv., 4; Meyr., Proc. Linn. Soc. N.S.W., 906, 1886).
Melbourne.

269. P. PERCOMPTARIA, Gn. (*Hypochroma percomptaria*, Gn., ix., 280, pl. vi., 4; Meyr., Proc. Linn. Soc. N.S.W., 907, 1886).
Melbourne, Gisborne.

*270. P. ACANTHINA, Meyr. (*Hypochroma acanthina*, Meyr. Proc. Linn. Soc. N.S.W., 910, 1886).
Gippsland.

*271. P. MUSCOSARIA, Gn. (*Hypochroma muscosaria*, Gn., ix., 281, pl. vi., 3; *H. emiliaria*, Walk. (*nec* Gn.), 441; *H. cetraria*, Feld, pl. cxxv., 7; *H. squamata*, *ib.*, pl. cxxvi., 14; *Hypochroma muscosaria*, Meyr., Proc. Linn. Soc. N.S.W., 910, 1886).
Melbourne.

EPIPRISTIS. Meyr.

FAMILY—SELIDOSEMIDÆ.

EPICOMPSA. Meyr.

DIASTICTIS. Hb.

272. D. AUSTRALIARIA, Gn. (*Halia australiaria*, Gn., x., 91; *Selenia apamaria*, Walk., 255; *Macaria remotaria*, *ib.*, 938; *M. gratularia*, *ib.*, 939; *M. infixaria*, *ib.*, 939; *M. frontaria*, *ib.*, 1,652; *M. panagraria*, *ib.*, 1,653; *M. porrectaria*, *ib.*, supp., 1,659; *Diastictis australiaria*, Meyr., Proc. Linn. Soc. N.S.W., 587, 1891).
Melbourne, Gisborne, &c.

*273. D. MESOMBRA, Lower (Tr. Roy. Soc. S.A., 160, 1893).
Fernshaw.

HYPOSIDRA. Gn.

OSTEODES. Gn.

DISCALMA. Meyr.

COSYMBIA. Hb.

SCIOGLYPTIS. Meyr.

274. S. HEMEROPA, Meyr. (Proc. Linn. Soc. N.S.W., 593, 1891).
Gisborne, Melbourne.

SELIDOSEMA. Hb.

275. S. SILICARIA, Gn. (*Hemerophila silicaria*, Gn., ix., 220; *H. mundifera*, Walk., 322; *Boarmia disrupta*, *ib.*, 391; *Hemerophila excursaria*, *ib.*, 1,532; *Selidosema silicaria*, Meyr., Proc. Linn. Soc. N.S.W., 598, 1891).
Melbourne, Stawell, &c.

276. S. CHELEUTA, Meyr. (Proc. Linn. Soc. N.S.W., 598, 1891).
Gisborne, Melbourne.

*277. S. SUASARIA, Gn. (*Boarmia suasaria*, Gn., ix., 243 (*teste* Moore); *B. proposita*, Walk., 390; *Tephrosia gratularia*, *ib.*, 415; *T. propinquaria*, *ib.*, 415; *Selidosema suasaria*, Meyr. (Proc. Linn. Soc., N.S.W., 601, 1891).
Gisborne, Cheltenham.

*278. S. EXTERNARIA, Walk. (*Tephrosia externaria*, Walk., supp., 1,591; *Selidosema externaria*, Meyr., Proc. Linn. Soc. N.S.W., 602, 1891).
Melbourne.

*279. S. CANESCARIA, Gn. (*Boarmia canescaria*, Gn., ix., 249; *Selidosema canescaria*, Meyr., Proc. Linn. Soc. N S.W., 603, 1891).
Melbourne.

*280. S. LYCIARIA, Gn. (*Boarmia lyciaria*, Gn., ix., 250; *B. poecilaria*, *ib.*, 250, pl. vi., 1; *B. semitata*, Walk., 389; *Selidosema lyciaria*, Meyr., Proc. Linn. Soc. N.S.W., 604, 1891).
Melbourne.

281. S. EXPRIMATARIA, Walk. (*Larentia exprimataria*, Walk., 1,704; *Selidosema exprimataria*, Meyr., Proc. Linn. Soc. N.S.W., 604, 1891).
Melbourne.

282. S. COGNATA, Walk. (*Boarmia cognata*, Walk., 392; *Selidosema cognata*, Meyr., Proc. Linn. Soc. N.S.W., 606, 1891).
Melbourne, Gisborne, Oakleigh, &c.

283. S. LEUCOPLECTA, Meyr. (Proc. Linn. Soc. N.S.W., 607, 1891).
Melbourne.

284. S. AGORÆA, Meyr. (*loc. cit.*, 608, 1891).
Melbourne.

285. S. EXCURSARIA, Gn. (*Tephrosia excursaria*, Gn., ix., 267; *T. exportaria*, *ib.*, 268; *T. phibalapteraria*, *ib.*, 268; *Hemerophila vestita*, Walk., 322; *Boarmia attributa*, *ib.*, 390; *B. decertaria*, *ib.*, 391; *Selidosema excursaria*, Meyr., Proc. Linn. Soc. N.S.W., 609, 1891).
Melbourne, Hamilton, Gisborne, &c.

286. S. ZASCIA, Meyr. (Proc. Linn. Soc. N.S.W., 613, 1891).
Melbourne.

287. S. ARGOPLACA, Meyr. (*loc. cit.*, 615, 1891).
Melbourne, Stawell.

288. S. BITÆNIARIA, Le Guill (*Boarmia bitæniaria*, Le G., Rev. Zool., 1841, 257, Gn., ix., 249, pl. iii., 1; *Gastrina erebina*, Walk., 326; *Selidosema bitæniaria*, Meyr., Proc. Linn. Soc. N.S.W., 616, 1891).
Melbourne.

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THE JOURNAL AND MAGAZINE

— OF —

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Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions he records.

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THE

Victorian Naturalist.

Vol. X.—No. 11. FEBRUARY, 1894. No. 123.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held in the Royal Society's Hall on Monday evening, 12th February, 1894. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and some 70 members and visitors were present.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that the meeting for practical work held on the 22nd January was well attended, and that it was the first of a series of meetings to constitute a course in practical botany. Mr. J. Shepherd, who directed the proceedings, provided a plentiful supply of the type chosen (Protococcus), and briefly described the various stages and the best methods of observing them.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. W. Richards, Miss F. Bage, Rev. T. Lord, and Messrs. H. Cummins, G. E. Shepherd, and W. E. Ellemor were duly elected members of the Club.

OFFICE-BEARERS.

There being no other nomination, Professor W. Baldwin Spencer, M.A., was declared duly elected to fill the vacant vice-presidentship.

PAPER READ.

By Mr. Dudley Le Souëf (communicated by Mr. H. P. C. Ashworth), entitled "Notes on a Trip to Northern Queensland." The paper was read by the author, and was well illustrated by limelight views, which gave a graphic representation of the tropical scenery and natural features of the district, those of the palm scrub about Cooktown being especially appreciated. It was in this scrub that Mr. Le Souëf was fortunate in securing several specimens of the curious Tree-climbing Kangaroos, and these, together with other mammals, birds, and snakes were brought alive to Melbourne for the Zoological Gardens.

At the conclusion of the paper some discussion ensued, in which Messrs. Frost, Shephard, Coghill, and Coles took part.

A vote of thanks was accorded Mr. Le Souëf for his interesting paper, and to Mr. J. Searle for his services with the lantern.

NATURAL HISTORY NOTES.

A note was read by Mr. J. Shephard on "Microscopical Preparation of Sponges." Specimens of *Sycon raphanus* and *Sycandra echinata* treated with osmic acid, and embedded without staining, showed the collared cells and flagellæ perfectly, but no trace could be seen of Sollas's membrane in these species.

Dr. W. M'Gillivray contributed a note recording the Greenshank (*Totanus incanus*) for Tasmania. The specimen is in the collection of Mr. T. Carr, and was shot on the mud-flats of the Tamar.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening :—By Mr. J. Gabriel.—Eggs of birds of the order Grallæ (Waders), and 14 species of eggs obtained during the Furneaux Group expedition. By Mr. J. A. Kershaw.—Eggs of *Menura Alberti* (Gould), *Halcyon Macleayi* (J. and S.), *H. pyrrhopygius* (Gould), *Colluricincla rufigaster* (Gould), with nest, *Platalea regia*, *Dendrocygna ragans* (Eyton), *Botaurus poecilopterus* (Wag.), *Butoroides flavicollis* (Lath.), *B. macrorhyncha* (Gould), and *Ardetta minuta* (Linn.), all from New South Wales. By Baron von Mueller, K.C.M.G.—*Sida Wilkinsoni*, new to science, discovered by Mr. Wilkinson at scources of the Flinders River, remarkable for its large depressed fruits : the specimens obtained had sprung from seeds which had germinated without shedding and pierced the axis of the fruit, the latter, unbroken, encircling the already leafy plant ; *Daviesia Croniniana*, a remarkable new species found by Mr. Cronin, near Lake Lefroy ; and *Haloragis alata*, a plant brought recently by Mr. Williamson from Curdie's River, and only once before recorded for Victoria. By Mr. A. Coles.—New Holland Goshawk (*Astur cinereus*) from Somerville, White Goshawk (*Astur Novæ-Hollandiæ*), pair Australian Goshawks (*Astur approximans*), and pair of Goshawks not mentioned by Gould, and proposed to be called the Spotted-fronted Goshawk, shot at Studley Park, Kew. By Mr. G. E. Hill.—Soldier Ant with fungus growth, from Horticultural Gardens, Burnley. By Master H. F. Hill.—A case of Victorian Lepidoptera, including *Holochila erinus* (Fab.), *H. moerens* (Ros.), *Hypochrysops delicia* (Hew.), *Ogyris olane* (Hew.), *Anthercea Helenæ* (White), *Cosmotriche vitulina* (Don), *C. exposita* (Lew.), *C.* sp., *Cryptophaga rubescens* (Lew.), and *Selidosema chionomera* (Lower). By Mr. C. French, jun.—Eggs of Macleay's Kingfisher, Northern Sphecotheres, and Pheasant Coucal, from Northern Queensland.

After the usual *conversazione* the meeting terminated.

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Franklin Inlet
Long Id.
Franklin Settlement
2300
Mt. Munro
CAPE
BARREN ISLAND
Cape Sir John
Mt. Kerford
Cape Barren
Preservation Id.
Armstrong's Channel
Rum Id.
Passage Id.
CLARKE ISLAND
Look Out Rock
N
BANKS'
STRAIT
FURNEAUX GROUP
C. Portland
TASMANIA
H.P.C.A.

REPORT OF EXPEDITION TO FURNEAUX GROUP.

By Joseph Gabriel, F.L.S.

(Read before Field Naturalists' Club of Victoria, 15th Jan., 1894.)

The islands forming this interesting group are situated near Tasmania, at the eastern entrance of Bass Straits, and are crossed by the 40th degree of south latitude—commonly called the "roaring forties"—and are, of course, subject to the usual vagaries of storm and tempest which that latitude bestows.

The group was first discovered by Captain Tobias Furneaux, in 1773. Furneaux started in company with the navigator Cook, but at that time was separated from him. Furneaux was steering up the east coast of Tasmania, and, when abreast of the group that now bears his name, stood over for New Zealand, recording as his opinion that "there is no strait between New Holland and Van Diemen's Land, but a very deep bay." The next mention of the islands was when Captain Hamilton, in 1797, ran a leaky ship ashore on the south end of the group, and a Mr. Clarke with a boat's crew, making for Sydney for relief, was again wrecked near Cape Howe. Eventually some of the party succeeded in reaching Port Jackson, and the colonial schooner *Francis* made two or three trips to the scene of the disaster on the Furneaux Group. During one of these trips the explorer Flinders was a passenger. Amongst other places in his geographical researches he named the Patriarchs, three remarkable hills on the island that bears his name, and the tower-like Babel Island on the east coast.

Although lying near the track of the Melbourne, Hobart, and New Zealand steamers, a distance of only 230 miles from Melbourne, they are comparatively unknown to the great body of our people. Yet these islands were the homes of white men long before Victoria was colonized. The islands number about fifty, the chief of which are Flinders, Cape Barren, Clarke, The Hummocks, Chappell, Sisters, Green, and so on. The population numbers about 250, half-castes and whites being in about equal proportions.

It was decided by the Club that the annual camp-out of 1893 should be on these islands, and in response to the usual notice, eight members sent in their names expressing their willingness to join the party. Unfortunately, through unforeseen circumstances, the number was reduced to four members—viz., Messrs. J. Gabriel (leader), A. J. Campbell, T. G. Campbell, and H. Ashworth, who, with two others, Messrs. J. F. Bradley and H. Gundersen, who have since joined the Club, formed the little party which, on 11th November, met on board the steamer *Alert* to do honour to the Field Naturalists' Club.

11th November.—Soon after noon we started with good

spirits on our journey, enlightened by the kindly greetings of Messrs. Fielder, C. French, jun., G. A. Keartland, Gillespie, and other friends, who had come to see us off. After a pleasant passage down the bay, calling at Portsea and Queenscliff to land cargo, we passed the Heads at 5.30 p.m., encountering the ocean swell and a nasty choppy beam sea, and about midnight the wind freshened from the eastward.

12TH NOVEMBER.—At daylight that inhospitable island Curtis was passed, which looked cold and misty through the drizzling rain. Curtis is a conspicuous landmark, rearing its almost perpendicular head 1,100 feet above the sea. Soon after Pyramid Rock was in view, but our artists were, like their instruments, prostrate. Pyramid is a most peculiarly shaped naked rock, standing solitary 300 feet out of the water, and the captain told us that on a moonlight night it could easily be taken for a full-rigged ship. Soon after passing this rock The Hummocks, of the Furneaux Group, began to loom up, and behind these Flinders Island. We were informed that smooth water would soon be reached, and we began to feel much better on receipt of the intelligence. Passing Goose (with its lighthouse), Badger, and Chappell Islands, we cast anchor off Green Island, where, through the kindness of Mr. Carstairs, a fellow passsenger, and whose boat was lying here, we were soon put ashore, when we received a most hearty welcome from Mrs. Robinson, the lessee of the island. This welcome was a very pleasant contrast to the reception from the weather, it being a misty, drizzly day, which would have been very unpleasant to us if we had elected to go on to Flinders Island and pitch our tents at once. It happened, also, that we got excellent advice from our kind hostess, which somewhat altered our plans. Green Island was of interest to us, for here the great ornithologist, Gould, lost one of his attendants, a fine young man, assigned to him by Sir John Franklin, and who was accidently killed by the explosion of a gun he was removing from a boat when landing. Since Mrs. Robinson has leased the island 900 snakes have been killed ; their places are now taken by 900 fat sheep. It being Sunday, and also raining, we remained quiet indoors, passing the evening very pleasantly with sacred music and recitations.

13TH NOVEMBER.—After a good night's rest we strolled over a portion of the island, taking two clutches (one with three eggs) of the White-breasted Oyster Catcher, and three clutches of the Red-capped Dottrel. After taking a few photographs, and bidding good-bye to Mr. Gundersen, who, with his son, elected to go to Pat's River, we left for Flinders Island about 10 a.m. Mr. Carstairs again kindly granted us his services, and after placing us on two outlying rocks, where we had barren results, landed us near Trousers Point. We soon had our luggage ashore, being

assisted by Mr. Carstairs and his friends. Bidding good-bye to these kind people, we were not long in choosing our camping ground, our previous insular experience being of great assistance to us. Unfortunately, water was at an inconvenient distance away from us, but we soon made satisfactory arrangements with a resident to supply us during our stay, which ended our little difficulty. The remainder of the day was spent in pitching our tents and arranging the luggage for convenient use. We found three tents necessary—one for sleeping accommodation, one for stores, and the third for cameras, ammunition, specimens, &c. Early to bed was the first order from the leader. A stretcher for five had been built by one of the party, making a very comfortable make-shift for a bed, and doing away with any fear of damp ground and snakes, which one of our members dreaded so much.

14TH NOVEMBER.—Our sportsman was off early with "Dave" Maynard (a half-caste, whose dwelling was some little distance from our camp) duck-shooting, or rather swamp-wading, and came back a few hours afterwards very disappointed, no ducks having been seen. Another party went exploring round Trousers Point, and after a few hours returned with little better result, shooting merely a Yellow-bellied Parrakeet and a Long-tailed Superb Warbler, a male bird in full nuptial plumage. They found the scrub in many places difficult to penetrate.

15TH NOVEMBER.—Shooting party out again with no results. Breakfast over, we formed a party of four and ascended one of the peaks of Flinders (1,500 feet above sea level and unnamed), where we took several photographs of Strzelecki and other peaks. During our ascent we gathered several botanical specimens, Mr. Campbell finding, on a rocky ledge, a fine clump of the orchid *Dendrobium striolatum* in full bloom. At the foot of this peak was a nasty belt of scrub ti-tree, which had been under the influence of fire or something else, and had been blown down with the branches the wrong way. We had to go through about half a mile or more of this belt, being relieved occasionally by wallaby tracks, and we were extremely glad when we got through it. The return, of course, was not so difficult, the branches this time lying the right way, and all we had to do was simply slide down them. On the way back we heard the pretty notes of the Grey-tailed Thickhead (*Pachycephala glaucura*), and soon found out the nest with three eggs, beautifully placed in the fork of a ti-tree. On getting back to camp we found Mr. Gundersen with a friend had come round from Pat's River.

16TH NOVEMBER.—Our sportsman, not to be beaten, left again at daybreak, this time returning with three species of beautiful ducks, which made a welcome addition to our larder. Mr. Ashworth departed with our visitors for Pat's River to try and

arrange with a resident there about a boat, but found he was away, and would not be back till Sunday. Fortunately for us however, Mr. William Holt, of Cape Barren Island, sailed round to us with the *Syren*, a fine double-ended cutter-rigged boat of about 9 tons, and fitted with fore and aft cabins. We soon arranged with him to take us about to the different islands. We were fortunate in gaining Mr. Holt's services, for we found him a most capable and obliging man, and we were indebted to him for much valuable assistance and information—for instance, that of the nidification of the Mutton Bird being of exceptional value, as his notes were based not only upon what he had observed, but by the dissection of the birds, male and female, at different periods.

17TH NOVEMBER found us impatiently waiting for the wind to moderate, but as it continued to blow half a gale, and showed no signs of ceasing for the day, a party was formed to visit Big River, six miles away, down the Sound. The embouchure of the stream forms a characteristic scene of the island. On the shore is a snug V-shaped corner backed up by scrub, while in the rear are some wild peaks of Flinders, cloud-capped. Mr. Ashworth and myself remained in camp, cooking and fishing. The latter was very delightful and profitable sport. We were most successful, however, in the evenings, when with the aid of a small seine net we landed fine specimens of Flounder, Garfish, Flathead, and Mullet. One haul of Mullet alone numbered eighteen dozen.

18TH NOVEMBER.—Weather abated at last. We started for the Sound about 6 a.m., when Mr. Holt soon landed us upon Isabella Islet, which he rents from the Tasmanian Government. We were soon gratified in finding the beautiful little White-faced Stormy Petrels *(Procellaria fregata)* in their burrows. We noticed that some of their eggs were slightly spotted at the larger end. We next visited Woody Island, then a rock between Woody and Little Woody Islands where we found several nests of the Sooty Oyster-catcher, Pacific Gull, and one of the Caspian Tern, which we photographed, putting the eggs, of course, into our basket. We continued down the Sound, which is fifteen miles long, and studded with romantic islets, with wild yet beautiful forms of mountains on either hand. Towards the end of the Sound we visited a reef off Samphire River finding several nests of the Pacific and a pretty rookery of Silver Gulls. Of the latter we took two pictures. The Pacific Gull *(Larus pacificus)* showed excellent taste in the choice of locality for their nests, Mesembryanthemum in full bloom being very abundant in the immediate vicinity giving the nesting ground a very pretty and rich appearance. The birds did not appreciate our visit, however, hovering over our heads and at the same time making a most discordant noise, evidently at the scarecrows raised by our cameras. As we had to make the most of the tide, we reluctantly left this interest-

CRISP PHOTO'' PROCESS.

NEGATIVE BY H. P. C. ASHWORTH.

Gannetry on Cat Island, Bass' Strait.

ing reef. We went ashore for water at what is locally known as the Yellow Beach. Two of the party explored inland and described the country as much resembling some parts of King's Island—everlasting scrub and here and there swamps. Finally anchoring for the night near some rocks in Opossum Harbour, as we had a few hours to spare before dark we landed on the rocks, where we found eggs of several sea birds, including the Fairy Penguin.

19TH NOVEMBER.—Early morning found us on our way to Babel Island, a distance now of twenty miles. Now again our troubles commenced. The little wind we had at the start soon died away to zephyr breezes, but not before we got out of the Sound and over three miles of shifting sand-banks, which are very dangerous, and sometimes build up a most unpleasant rip. The remaining portion of the day was spent on the bosom of an ocean swell, sometimes making a little headway, meals under difficulties, some scientists squeamish, crockery wandering on deck, raining, and Captain Holt not swearing—very nearly though. But, in spite of all, Babel Island was reached about 6 p.m., where we anchored, between Cat and Storehouse Island. Supperless, we retired early to bed. A low barometer made Mr. Holt very anxious, because we were lying in a very exposed position; moreover, with the stiff westerly breeze the cutter tugged and plunged at her cable all the live-long night.

20TH NOVEMBER.—At daybreak I was called by Mr. Holt, to find the boat swinging by two cables and the wind blowing half a gale, but fortunately not from the dreaded quarter—viz., the east. I took watch so as to allow Mr. Holt to have a rest, he having been up all night. Soon after breakfast we had a consultation, as we were very dubious of landing, on account of the high sea running. To make matters still more annoying, we could see the Cormorant rookery on Storehouse Island, and the Gannet rookery on Cat Island, in full swing. This latter we had risked all and ventured so far to see. But our anxiety was soon set at rest by Mr. Holt, who, with our willing assistance, heaved up the anchors and sailed under the staysail to what turned out to be a more sheltered spot nearer Cat Island. We landed with some difficulty per dingy at 10 a.m., and soon found our way to the Gannet rookery. Here all our troubles and seasick qualms were soon forgotten and amply repaid by the wonderful sight which stood revealed before us. We found between 2,400 and 2,600 birds (roughly estimated by measuring) seated in the locality on their nests. The birds were in no wise put out by our presence, and we photographed to our hearts' content. The nests were built on slightly raised mounds of clay and a good admixture of guano, of which the place smelt strongly, and were composed of twigs, algæ, and polyzoa. Each nest contained one egg only, and not two as stated by some authors. Hovering over the

rookery, and coming and going from seaward, were the mates of the sitting birds. It was the prettiest of sights to see these birds alight alongside their mates, kissing and caressing them in a most loving and affectionate way. Occasionally one of the new comers would eject from its throat a fish which it had brought in from the sea. It is really wonderful, the size of fish they carry—15 inches was the measurement of a pike which we found lying near one of the nests, and we saw the remains of others which must have measured still more. Frequently we would see a handsome Gannet rise on its feet off its egg and flap its wings to stretch its feathered limbs; should the bird be so unfortunate as to lose its balance it soon regained its position, hastened however by its neighbours, who viciously pecked at it, as much as to say "Keep your own ground." The nests, as far as the inequality of the ground would allow, were arranged in symmetrical rows, and were about 30 inches apart. The diameter of the rookery was about 50 yards, and it was circular in shape. The birds had been at work for some time, as we found several stages of growth of young, from the half-grown gosling down to that just hatched; but the greater number of nests were occupied by eggs, many quite fresh. The young, when covered with down, look very handsome. The old birds seemed to defend the eggs more fiercely than they did the young, and I had to approach them with considerable respect, requiring the aid of a bucket and fishing basket for them to peck at while securing their eggs. Promenading around the rookery and sometimes through the rows were to be seen those impudent scavengers, the Silver and Pacific Gulls, waiting their chance (a very poor one) of taking the eggs and pieces of fish lying about. It seems almost ludicrous that this should occur, the Gannet lying so close on its egg, and being so large a bird, one blow from its powerful beak would kill so small a bird as the Silver Gull. After our artists had taken photographs from different points of view, we very reluctantly retired from this wonderful rookery. We were soon joined by our sportsman in triumph, for he had bagged a couple of Cape Barren Geese, but was very much chagrined when we told him they were protected birds. However, a brace out of a flock of thirty could not be missed. As the wind was still rising we hurried on board, and soon left the dangerous anchorage, very nearly getting on to the rocks in making our first tack, just being saved by the excellent seamanship of our skipper. After beating about in a nasty, choppy sea for three or four hours, we succeeded in getting shelter in a snug little cove under Babel Island. Babel Island proper is about two miles long, and is situated about the same distance from Flinders Island, on the exposed east coast. Babel consists of five peaks, the highest being 650 feet. The tower-like appearance of the centre one no

doubt suggested the name "Babel" to the explorer Flinders. Wallaby and snakes abound in the scrub, and Mutton Birds on the grassed or east end, while the rocky battlements are adorned with pig-face weed and other climbing plants which hang over in graceful garlands. Here we found two half-castes, who had come round a few days before to Wallaby hunt and take Mutton Birds and eggs. It was through their making a "bit of a smoke," as the islanders call the signal on shore, that we were able to steer for the cove, which was almost hidden from our view, so snug was its situation. A hasty tea and a climb up the Babel-like tower was the order before turning in for the night. We were soon fast asleep, only however to be turned out at 3 a.m.

21ST NOVEMBER.—The wind had changed and was blowing right into the cove, so that there was nothing for it but to kedge the boat out far enough to get an offing, when we set sail again for Storehouse Island, anchoring within 100 yards of the Cormorant Rookery. While having breakfast we were deeply interested with the movements of these birds. Landing, we soon got to work. Our sportsman bagging a brace of Swamp Quail; and our leader taking a long tramp round the island, when he returned he found the artists had finished photographing and recording observations of the rookery. The birds in this instance did not allow us to drive them off the nests, but went without asking. We did not linger here, as the noise of the young ones was unpleasant, while the pungent ammoniacal aroma of the live guano was still more unpleasant. The nests were built of herbage and seaweed, and in some instances were skilfully placed on shelving rocks. The full clutch of eggs numbers three. They vary much in size, as you will see in the exhibit this evening. On our leaving the rookery the old birds soon joined their young. I fancy they had a difficulty in sorting them, as the little things had huddled together in bunches of about six or eight. We again landed on Cat Island, as the weather was favourable, to pay a farewell visit to the Gannets, and to take a few more photographs under more favourable conditions as to weather. It was a special treat, in an ironical sense, going and coming from the rookery. The greater part of the island was a network of Mutton Bird holes, and into these we sank at frequent intervals, sometimes losing our balance in a most ludicrous way, and disturbing the Penguins who had taken possession, and who set up a hideous squawking as a mild protest against our disturbing their homes. We were informed that the Penguins had caused the Mutton Birds to desert this island altogether. Quail were in abundance on both islands, but, although our sportsman shot several, only a few could be found, owing to the dense tussocky grass that abounded, and, not having a dog, he soon ceased his sport. After collecting some Polyzoa we hurried on board, as the wind

this time was slackening, and started back for Franklin Sound. A few minutes after we noticed a shoal of Mackerel being pursued by Porpoises. It was interesting to watch the cunning manner in which the porpoises swam round and round, much after the fashion of a dog shepherding sheep, so as to keep the shoal together, while at frequent intervals one would dash in for a mouthful, resuming its original position immediately in rounding up again. Little wind and slow sailing was again experienced on our return. When we approached the bar we became very anxious; the wind had almost died away, but after considerable difficulty, not unattended with danger, we succeeded in getting through the rip, or the "pot-boil," as it is locally called. We had to take to rowing in turns with a long oar. At intervals the blind rollers would rise and approach us in a most threatening manner, striking terror into the hearts of some of the party, and causing the boat to sway about in a most uncomfortable fashion, while the boom bobbed over the heads of the oarsmen in such a manner as to cause them to wonder whether the halyards were sufficiently strong to bear the jolting strain. However, we got across without further mishap. Soon after, as the wind had failed altogether and the tide was against us, we anchored in the fairway for the night.

22ND NOVEMBER.—Between 2 and 3 o'clock in the morning, at the first faint streaks of dawn, the wind and the tide changed in our favour. Taking advantage of this we weigh anchor at once and spin up the Sound with a free sheet. We enjoy being on deck before sunrise. However, the morn is chilly, and the mountain forms, cloud-capped, on either hand look cold, but the fragrant scent from inland shrubs wafted across the Sound is most delightful and invigorating. At a glorious sunrise the favourable wind slackens; nevertheless we are able to make our camping quarters at Trousers Point in time for breakfast, thus ending an adventurous trip of five days to Babel Islands.

23RD NOVEMBER.—About 7 a.m. three of us started to ascend Strzelecki Peak, which was, as the crow flies, three miles from our camp, and its clearly cut granite crown is 2,550 feet above sea level. Our course lay through loose sand, thorny scrub, ti-tree, and a swamp through which we had to wade, flushing some duck while doing so. More ti-tree followed, and another belt of scrub with its branches all laid the wrong way. We here encountered our first snake, basking on some ti-tree. Arriving at the foot of a large hill we found we had to proceed round until we came to a gully, which we ascended, and after some difficulty gained the top of an apparent ridge of about 1,500 feet; this, we expected, would lead us with little difficulty to the Peak. We found, however, that we had to descend some 300 feet, and cross over a fern gully to another hill. We encountered some magnificent growths on the way across—lichen, mosses, &c., growing in great luxuriance.

Specimens of these have been forwarded to Baron von Mueller and different specialists in Europe for naming. Ferns also were growing freely, the genera Asplenium, Pteris (several species), Dicksonia, Polypodium, Lomaria, and others being well represented. More extraordinary, topsy-turvey places could hardly be imagined. Weird cavernous openings were on either hand as we ascended. If one of us had slipped he might have landed somewhere, but where it would be a puzzle to say—perhaps at the source from whence the "Cape Barren Island guns" are fired. During our stay on Flinders Island we heard a discharge of this subterranean artillery. The islanders say that sometimes several occur in a day, and then perhaps there is an interval of weeks before one is again heard. The boom is just like the discharge of distant cannon, and seems to come from the south-east end of Cape Barren Island. Perhaps geologists can explain the phenomenon. We, however, got to the other side without mishap, and soon again started the ascent. At an altitude of 1,500 feet we encountered our litttle friend the Pink-breasted Robin (*Erythrodryas rodinogaster*). We now began to feel that it was luncheon time, but our leader was firm, and pointed to the Peak, still 1,000 feet above. After continuing to ascend for another hour nature asserted itself, and, finding water on a jutting rock, we boiled the billy and sat down to a well-earned lunch. We planned out our course, which we followed with sundry deviations, striking another fern valley on our way. This valley proved a friend, and guided us several hundred feet up the Peak where soon we had the pleasure of shaking hands upon the highest point of Strzelecki; time, 3.40 p.m., thus taking 8½ hours to perform the journey. Amply were we repaid for our climb. Like a living map the whole of the Furneaux Group, with the exception of Clarke Island, which was hidden by Mount Munro, was within view, and the islands were easily counted, while in the distance Tasmania loomed up very distinctly. We planned out a different course for our return journey, and, having no time to lose, started the descent a few minutes before 4 p.m., disturbing a small snake as we passed a few feet from the top, and succeeded with considerable difficulty in getting below the rocks, as night came on apace. We steered by the Goose Island light until we gained the flat, and then by star across ti-tree and swamp, finally reaching the camp, thoroughly tired and hungry, a few minutes before 9, thus taking a little under five hours for the descent. We gathered many plants, but to our disappointment none were new. On the way down, at an altitude of 1,200 feet, we found a fine mass of the orchid *Dendrobium striolatum* measuring 10 feet by 7 feet, in full bloom, growing on a shelving rock. A fine specimen of the beautiful *Lycopodium varium* was found at an altitude of 1,400 feet. At the same height we noticed the

Blue Gum *(Eucalyptus globulus)* growing upon a cone-shaped mound. The tree had grown gnarled and stunted, and the cone of the rock and earth were thickly interspersed with mosses, Polypodium and other ferns, forming a unique and pretty natural picture. We found the coral fern, *Gleichenia circinata*, growing at an altitude of 2,400 feet.

24TH NOVEMBER found us weather-bound till noon. We then started for Cape Barren Island, nine or ten miles across the Sound, arriving at 2.30 p.m., where we were cordially received by Mr. Edward Stephens, the schoolmaster and religious instructor to the half-caste settlement, who, with his wife and family, made our stay quite a pleasure. Very prettily situated are the church and school buildings. The Tasmanian government and Diocesan authorities have evidently made an excellent choice in appointing Mr. Stephens to the post. His and his wife's chief aim seems to be the education and spiritual welfare of the people of the settlement, and it was pleasing to hear the enthusiastic way in which they spoke of their task.

25TH NOVEMBER.—We were again weather-bound, and spent our time in visiting and photographing the half-castes, who were naturally of a retiring disposition. Some of us walked several miles across the island, through some good country in the blue-gum forest. At night we provided an entertainment for the people, who turned up *en masse*, and duly appreciated our efforts in recitations and music. We were thanked in a neat speech by our host, and after supper and a short service we retired for the night.

26TH NOVEMBER.—Left Sandford Bay for the settlement at 8.30 a.m., and beat across to Chappell Island by noon. The natives call the island "Humpy," on account of its cone-shaped crown, which stands 650 feet above the sea. The foreshore above the rocks is comparatively flat, and is clothed with tussock grass, saltbush, nettles, and snakes. Such is a scant description of the greatest Mutton Bird rookery in the Straits. Here we found a large number of the islanders (men, women, children, and dogs) had come over from Cape Barren Island for birds and eggs. We visited the eggers' camp and took some photographs, but found the people very shy. After tea I walked over to watch the men diving for coral, as they called it. The pieces of Gorgonia and the Hydroid *Ceratella fusca* exhibited, with about a dozen species of Polyzoa, were the result of my visit. These men were almost like fish in the water—several times I saw them disappear under the rocks and kelp, and come out, however, puffing like porpoises. Night was now approaching, and the Mutton Birds, which we had seen in the distance a little before, were now flying around the island waiting until dark, when they soon alighted, and then Bedlam was let loose. A description of this sight can convey but a small idea of the reality. It has to

be witnessed, and even then we can grasp but an indefinite idea of the number of birds which visit this island. The large number of 200,000 are annually taken for food, not to mention the number of eggs. Yet, in spite of this enormous drain, still the birds come as thickly as ever. God's provision for man, indeed, for what these islanders would do without these so-called Mutton Birds for food would be a difficult question to answer. During our stay we were enabled to unravel the vexed question when the birds first start to lay, with the following result:—The birds first appear on the islands about the end of September to clean out the holes, after which they leave until 18th November, the earliest date, to the 28th, the latest date, when the cock bird appears. A day or two after this the hen bird calls and deposits her egg, going off to sea again to recruit. In about a week's time she returns to relieve her mate, who by this time is pretty well starved or thinned down. She then takes a turn, to be relieved in the same way, and so on, turn in turn, until the chick is hatched. In April the young is deserted, and has to be thinned down for seven to ten days before being able to fly. And then we hear no more of Mutton Birds for five months. Where they go to during these months is a question to be decided. Some suggest warm localities, but this would have been recorded ere this. I myself think they go to cool regions. The birds are very oily and fat, and this, I think, would go to support such a theory. However, it is a very interesting point to settle. Snakes are numerous in this island, being frequently taken out of the Mutton Birds' burrows by the islanders. We killed three, averaging 5 feet long, during a walk one morning. They are the brown variety, and appear very sluggish in their habits.

27TH NOVEMBER.—We turned out at a glorious sunrise, and at 7.45 a.m. started for Chalky Island, on the west of Flinders Island, arriving there about 10 a.m. We found one clutch of Caspian Tern's eggs only. Touching at Mile Island on our way, we steered for Pat's River, on Flinders Island, intending to take Mr. Gundersen on board, but found he had already departed towards our camp. After begging a loaf of bread from Mrs. Verreux we enjoyed tea on the beach, and then turned in on board the cutter for the night. Two of the party, however, elected to walk round to camp, a distance of about 12 miles.

28TH NOVEMBER.—We left anchorage with the first streaks of day, about 3.30 a.m., and after dredging on the way, with poor results, arrived at the camp about 6 a.m. After breakfast two members sailed in a boat for Woody Island, but did not reach it, the wind being contrary. They landed at Isabella Rock to take a few more Stormy Petrels, and returned to camp late in the afternoon. Two of us had another trial through the scrub, but the rain came down so freely that it necessitated a speedy return to camp, so we spent the remainder of the day in blowing eggs and packing up.

29TH NOVEMBER.—Three members were out at daylight shooting birds for specimens, returning at 6 with a few. After a hasty—and our last—breakfast on the scrub-clad, rock-girt island of Flinders, we broke up camp and got on board the *Syren*, also for the last time, with all our luggage and treasures, shortly after 8 o'clock. As we entered the fairway we discerned the smoke of the *Alert*, and boarded her about 11 a.m., Captain Mathieson being punctual to the appointed time. We soon headed for Melbourne, passing the Pyramid Rock about 3 p.m., and Curtis Group about 6.30, taking photographs of each as we went along. Little did we think that delightful evening, when taking the picture of Curtis from her deck, that the *Alert* would so soon founder and go down, not so far from the locality, leaving her gallant officers and crew struggling with the waves for dear life, and all save one finding a watery grave.

30TH NOVEMBER found us through the Heads at 6.30 a.m., having experienced a most delightful passage across the Straits. During the run up the bay Richardson's Skua (*Stercorarius crepidatus*) were flying in our wake. These birds were first noted for Australia by Mr. A. J. Campbell, while returning from Tasmania, in 1883. Arriving at the wharf at 10 a.m. we were not long in getting to our respective homes, thus ending the expedition to the Furneaux Group.

We cannot claim very great scientific results for the trip, as, owing to the absence of collectors of other branches of natural history, the expedition was devoted principally to ornithology. However, the details of the extraordinary nidification of the Gannets, the additional notes of the nidification of the Mutton Birds, together with information obtained of the scarce Cape Barren Geese, should be sufficient to stamp it a success. We greatly regret the absence of our co-workers in the Club, and did our best to do some of their work, but with poor success, lacking, of course, their experience; and we are disappointed at having been unable to do more land work, but the scrub was almost impenetrable, and through stormy weather we had but eight or ten clear days in which to do our work both on land and at sea.

The thanks of the Club are due to Messrs. Huddart Parker and Co. Limited for their kindly consideration in meeting us *re* passage to and from the Group, and to the late Captain Mathieson and his brave officers for their assistance during the time we were on board the since ill-fated steamer. Also, we are indebted to Captain Anderson (Chief Inspector of Fisheries) for his advice and kindly interest; also for the loan of a fishing net, which we found exceedingly useful while on the islands; also, to the Lands Department of Tasmania for useful maps and plans; and to Mr. H. Walpole, Yarraville, and Mr. R. Davies, Armadale, for the use of tents.

MAMMALIA.

The animals noted at the Group consisted of *Mus* (two species), *Halmaturus Billardieri* (Red-bellied or Stump-tailed Wallaby), *H. Bennettii* (Bennett's Wallaby or Brush Kangaroo), *Phalangista canina* (Short-eared Opossum), *P. viverrina* (Ring-tailed Opossum), *Dasyurus maculatus* (Tiger Cat), *Phascolomys platyrhinus* (Wombat), and *Echidna setosa* (Brown Porcupine).

J. G.

ORNITHOLOGICAL REMARKS.

By A. J. Campbell, F.L.S.

As may be expected, the avifauna of the Furneaux Group pertains to that of Tasmania. The land birds we identified were from the Funereal Cockatoo, in black garb, down to the handsome Long-tailed Blue Malurus, or Superb Warbler, and the lovely Pink-breasted Robin, while Shrike-Thrushes, Dusky Robins, and others enlivened the vicinity of our camp with song. Nests were taken of the Dusky Robin with a pretty set of greenish eggs, also the nest of the sweet-throated Grey-tailed Thickhead. But to the sea-birds we must repair for our more interesting notes.

Cape Barren Goose (*Cereopsis Novæ-Hollandiæ*).—Of these remarkably fine and somewhat scarce birds we saw a flock of about 30 on Woody Island and another lot of 20 on Chalky Island, while a few were seen on Babel Islands, off the east coast of Flinders Island. They are also found on other islands of the group, notably Pascoe, Forthsay (a breeding place), and Penguin Islands. Excepting some goslings, which we secured, we were too late for the breeding season, but we came across a deserted nest on Mile Island. A good layer of grass formed the nest, which was placed amongst salt-bush and tussock grass with ice-plant near. It measured 18 inches across, the inside measurement being 9 or 10 inches by 3 inches in depth. A nest containing eggs is usually lined plentifully with down. The clutch is small, the complement being only 5 or 6 eggs.

Mrs. Robinson, of Green Island, who has kept the Cape Barren Goose in captivity, kindly furnished us with interesting habits of the bird. Each bird has its own spouse. Should a goose lose her mate the probability is she joins a wild flock, and never returns. But should the gander lose his wife he entices another wild bird home to dwell with him. An old bird never mates with a young one (a lesson for the *genus homo*), nor do young ones from the same clutch pair or breed. The birds do not lay until they are two years old. As well as being situated upon the ground, nests built of grass and seaweed are sometimes placed in thick scrub about 6 feet high. When the eggs have been robbed repeatedly, the birds have laid again, thrice in a season, in the same nest. A pair of Mrs. Robinson's birds continued to sit on a set of addled eggs. These were replaced by young from another nest, which were at once appropriated and

reared by the owners of the addled eggs. The birds possess a voracious appetite, their chief food being herbage of various kinds. They eat all day, and frequently by night, quickly digesting their food. Sheep will not graze after them. This is not so with the common domesticated goose. Cape Barren Geese being destructive to grass, and likewise the garden plots of the islanders, the people consequently, and somewhat selfishly, do not favour or assist in the protection of these fine birds. As food they are excellent, being tasty and gamey, judging by the two we had roasted in camp. The only exception we took was the flesh being a little dry, but probably this was our method of cooking. The voice of the birds is curiously hoarse, and at intervals they grunt like a pig, so much so that since I brought my pair home I am informed the Inspector of Nuisances called, supposing I kept pigs, contrary to the regulations.

Australian Gannet *(Sula serrator)*.—Mr. Gabriel has already described to you the wonderful feathered congregation on Cat Island. I propose merely to add a few details. The rookery was about 150 yards in circumference, the nests being placed, with some sort of regularity, in rows 30 inches apart, and in each row the nests, from centre to centre, were divided by the same distance. The nests are low, built of the surrounding soil and *débris* scraped up and well trodden, and slightly concave on the top. The outside circumference is about 5 feet, the height being 4 or 5 inches, the concave top where the egg is deposited being 7 or 8 inches across by 1½ inches deep.

The young or newly hatched birds were naked or nearly so, and of a leaden or dark slate colour. The older ones were clothed in down of snowy whiteness, oddly contrasting with black feet and bill. On approach the old birds simply give a goose-like cackle, making a sound not inappropriately resembling the words "Get away, get away!" at the same time fencing you with their wings and formidable nebs. Our visit was on the 20th and 21st November, which appeared to be the middle of the laying season. Probably October is the month they first commence to lay, as I have previously received eggs taken from the same rookery during that month. It would, however, be interesting to record when the young are feathered and leave—possibly March or April, when the Mutton Birds commence to move.

Short-tailed Petrel, or Mutton Bird (*Nectris brevicaudus*). —From the islanders we learnt much, and some hitherto unrecorded information. From about the 13th to the 16th September the birds first arrive to clean out their burrows, and, it is presumed, also to mate. Much house cleaning, expelling snakes, and marrying and giving in marriage are carried on day and night till about the first week in November, when all go to sea again for a trip. The return of the birds, both male and female, commences about the 18th November, and continues for about ten days, the

great focus of arrivals being probably the 25th or 26th of November. The first eggs taken during our visit were from Babel Island, where we ascertained they were secured on the 18th, while we were present at the great arrivals of birds on Chappell Island on the evening of the 26th. A truly marvellous sight, and worth the trip itself to see. On the egg being deposited, the female leaves for a week to recruit and grow fat at sea, while her lord steadfastly sits. He goes out the following week, and so on, turn and turn about, for eight weeks, till the egg is hatched. The young are fed in the burrows till about the middle of April, when they are simply a ball of fat, and heavier than their parents. At this stage the parents desert them. As a consequence, fatty degeneration ensues, quills and feathers sprout, and the youngsters, becoming impatient and hungry, clear out too about ten days or a fortnight after their parents. By the first week of May not a feather remains upon the island. Where the birds, young and old, disappear to no person seems to know; nothing is seen of them till the following spring, when some balmy evening in September the familiar dusky forms may be again seen swiftly cutting the horizon and approaching from over the sea.

For food the islanders commence to preserve the young birds about the 20th March, carrying on the operation till the birds finally quit. The young is dragged from its burrow, its head is placed between the first two fingers, a downward jerk, together with the weight of the bird's own body is given, and the neck is easily dislocated. Fifty or sixty are thus strung on a spit or stick, care being taken to keep the head upward so as not to lose any oil. This oil, which is reddish in colour, is drained from the bird and is used for lighting and for other purposes. Feathers are then plucked, the body scalded to remove all down, and the feet are cut off. The bodies are placed on the grass to cool by evening, when they are cleaned, head and neck removed, and finally salted and pickled in barrels, each family taking about 500 or 600 birds or more for home consumption. As a food the birds are much prized, and persons who are fond of bacon and pork and other fat foods readily take to Mutton Birds.

On account of the great annual drain of these economical birds, as well as the number of eggs taken every November, I may be asked if the number of birds is diminishing. Judging by the evidence of the islanders and our own observations nearer home on Phillip Island, Western Port, I should say "No." For if the birds were unmolested the burrows on the islands would not contain them, so great are their numbers. All the burrows being occupied, thousands upon thousands of eggs would be, and are even now when the glut arrives, deposited upon the bare ground or grass, and by exposure perish, or are devoured by sea gulls and other enemies. However, legislation may be needed in the near future with regard to depasturing cattle and sheep upon

islands containing "rookeries," for these animals, treading over the place, cave in the burrows and squash both young and old. Lessees of islands might be required to fence the rookeries off.

White-breasted Cormorant *(Graculus leucogaster)*.—We found an interesting rookery on Storehouse Island, off the east coast of Flinders Island. The nests were terraced upon ledges and tops of naked granite on the seashore. We estimated there were between 300 and 400 nests, and as the season then (21st November) was somewhat advanced for these birds, they were mostly occupied by fledgelings in black down with a little mouldy-white cover on the underneath parts. The newly hatched young were quite naked. However, some of the nests contained one, two or three eggs, but generally a pair, some quite fresh. The nests were comparatively large, and were built of seaweed of various kinds and colours, saltbush, &c., the diameter of an average-sized nest being 18 inches by 3 or 4 inches high, while the receptacle or hollow holding the eggs was 8 or 9 inches across by 2½ inches deep. Like the Gannet rookery, the aroma of the live guano was very pungent.

White-faced Storm Petrel *(Procellaria fregata)*.—On the 18th November with genuine delight we invaded a rookery of this dear little creature. It was indeed a romantic situation—an islet in a sheltered sound, grassed with tussock, brightened with crops of wild white flowers, and surrounded with great outcropping granite rocks, lichen covered, like sentinels guarding the place. From under the grass in the ground, out of the rat-like burrows, which extend the length of one's forearm, we withdrew the soft and delicately plumaged little birds, each with a single egg; and remarkable as it may appear (especially to those who pretend to possess a theory on the colouration of eggs), about four in every ten of the eggs were slightly spotted at the one end, the egg usually being pure white.

Terns.—These graceful sea-birds are always of fascinating interest to ornithologists. We found nests of the large Caspian Tern (*Sterna caspia*), the bird easily recognized by its large size and beautiful silvery plumage, relieved by powerful red bill. The birds were in solitary pairs about the islets, the nest being usually situated on the rocky summit of the islet, and merely a slight hollow (7½ inches by 1½ inches deep) in the coarse sandy earth amongst pig-face weed, green or dead. The flocks of Bass Straits Terns (*S. bergii*), noted, with yellowish bill, upon the Samphire River reef, had not laid. The smaller Southern Tern (*S. frontalis*), with black bill, was observed in a colony on a rock between Woody and Little Woody Islands, in Franklin Sound. They also had not yet laid in their nesting hollows amongst the short matted ice-plant and other weeds. The Little Tern (*Sternula nereis*) was scarce. We only saw it at one or two points, when it flew up against the wind to screech at us.

The Oyster-catchers' eggs, on account of their singularly bold marking, are always handsome. The most common kind proved to be the Black or Sooty Oyster-catcher (*Hæmatopus unicolor*). Sometimes several instances of pairs of eggs were found on our rocky islet, taken in hollows 7 inches across by 1½ inches deep, at foot of tussock grass or amongst pig-face weed, on top of rock or between rocky ledges. The White-breasted Oyster-catcher (*H. longirostris*) appears the rarer of the two species, at all events on the parts of the islands we visited. It was gratifying to record the unusual number of 3 eggs found in a nest of this showy species on Green Island. The nest was merely the usual depression (6 or 7 inches across by 1 inch or so deep). The situation was in the sand, near herbage, about high-water mark, and contained pieces of broken shells and other marine *débris*.

Gulls.—The nests of the large Pacific Gull (*Larus pacificus*) were warmly constructed of grass (roots and all) and flowers, and were sheltered with tussock grass, salt bush, or points of jutting rock. The nests measured 10 or 11 inches across and somewhat deep, being 3 or 4 inches. The full complement of eggs is 3, but we frequently found a pair only.

The pretty Silver Gull (*Larus Novæ-Hollandiæ*), however, breeds more in colonies. The one we visited on the Samphire River reef contained 21 nests, which were placed on the ground, amongst the short herbage, at various distances from each other, the nearest being 34–35 inches apart. These nests were not nearly so substantially built as those of the Pacific Gull, but were frail things of seaweed of various kinds, measuring 6 or 7 inches across by an inch deep, and contained from 1 to 3 eggs. It is worthy of note that upon the outside of this "rookery" we found a pair of Oyster-catchers' eggs.

REPTILIA.

The reptilia collected consist of *Diemenia superciliosa* (Brown Snake), found also in Victoria, and the lizards *Amphibolurus angulifer* (Gray), *Egernia Whitii* (Larcép.); and *Liolepisma metallicum* (O'Shaughn.), common to both Victoria and Tasmania; and *L. ocellatum* (Gray), found only in Tasmania.—C. Frost.

POLYZOA.

Owing to the short time at my disposal during the trip, I was unable to make as large a collection as I expected. However, the 41 species obtained, together with the 47 which I gathered during the trawling trip of the *Lady Loch*, principally off King Island, and the 74 species from the Kent Group, go to prove how evenly distributed are the Polyzoa of Bass Straits. All of these are to be found in Victorian waters. But many are more abundant in the Straits than in Port Phillip or Western Port.

For instance, *Canda arachnoides*, *Scrupocellaria ornithorhynchus*, *Bugula neritina*, *Catenicella elegans*, *Cribrilina acanthoceros*, *Densipora corrugata*, *Microporella diadema* (var. *longispina*) are, comparatively speaking, rare in Victorian waters, while at the Furneaux Group I found them very readily—*C. elegans*, *B. neritina*, and *D. corrugata* literally by handfuls.

The following are the species obtained :—

Aetea anguina
Catenicella elegans
,, Margaritacea
,, cribraria
Cellularia cuspidata
Scrupocellaria ornithorhynchus
Canda arachnoides
Caberia glabra
,, Darwinii
Menipea tricellata
,, crystallina
Bugula cucullata
,, neritina
Flustra denticulata
Craspedozoum roboratum
Pyripora polita
Amphiblestrum cervicarnis
Membranipora corbula
Biflustra perfragilis
Cribrilina monoceros
,, acanthoceros
Microporella diadema (var. longispina)
,, Malusii
Chorizopora Brogniartii
Smittia Landsborouii
Mucronella vultur
,, tricuspis (var. munita)
Cellepora costata
,, spicata
,, intermedia
,, longirostris
,, bispinata
Retepora monilifera
,, porcellana
,, aurantacea
Crisia acropora
,, Margaritacea
Lichenopora Wilsoni
Densipora corrugata
Amathia Woodsii
,, inarmata

J. GABRIEL.

HYDROIDA.

CERATELLA FUSCA (Gray).—This interesting Hydroid, the structure of which was described by Prof. W. B. Spencer, M.A., in a paper read before the Royal Society of Victoria in June, 1891, and published, with some excellent plates, in the "Transactions" of the Society, was found in abundance on several of the islands of the Furneaux Group. It was somewhat difficult to obtain, being found only at very low water. The specimens obtained, however, had to be brought home dry, as I was unfortunately out of spirit.—J. G.

BOTANY.

Baron von Mueller, K.C.M.G., kindly reports that of the plants collected by the party the following are the most important, viz. :—*Comesperma ericinum* (De C.), *Zieria Smithii* (And.), *Boronia polygalifolia* (Smith), variety with compound leaves; *Phyllanthus Gunnii* (Hooker), *Melaleuca decussata* (R. Brown), *M. squamea* (Labill.), *Pimelea cinerea* (R. Brown), *Dampiera stricta* (R. Br.), *Westringia rosmarinifolius* (Smith), *Styphelia oxycedrus* (Labill.), *Dendrobrium striolatum* (Reichenbach), and *Lycopodium varium* (R. Brown).

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President:

MR. H. T. TISDALL, F.L.S.

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With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor, Mr. F. G. A. Barnard, Kew.

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The Author of each article is responsible for the facts and opinions he records.

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THE

Victorian Naturalist.

Vol. X.—No. 12. MARCH, 1894. No. 124.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held in the Royal Society's Hall on Monday evening, 12th March, 1894. Professor W. B. Spencer, M.A., a vice-president, occupied the chair, and some fifty members and visitors were present.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library:—"Proceedings of the Royal Society of Victoria," vol. vi. (new series), from the Society; "Transactions Royal Society of South Australia," vol. xvii., part 2, from the Society; "Proceedings Boys' Field Club of South Australia," 1893, from the Society; "Catalogue of Australian Birds," part 4, by Dr. Ramsay, from Trustees Australian Museum; "Queensland Flora—Botany Bulletin No. 8," by F. M. Bailey, F.L.S., from the author; "Lizards Indigenous to Victoria," by A. H. S. Lucas, M.A., and C. Frost, F.L.S., from the authors; and *Geelong Naturalist*, from Gordon College (Geelong) Field Naturalists' and Science Association.

REPORTS OF EXCURSIONS.

Reports of the Club excursions to Hampton, on 17th February, and to Heidelberg, 10th March, were received from the respective leaders, the Rev. W. Fielder and Mr. J. Shephard.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that the usual meeting for practical work was held on the 26th February, when there was a good attendance, and that, under the direction of Mr. J. Shephard, the botanical type Spirogyra was worked out.

ELECTION OF MEMBER.

On a ballot being taken, Mr. W. J. Kerr was duly elected a member of the Club.

GENERAL BUSINESS.

The Chairman drew attention to the notice with reference to the annual conversazione proposed to be held in June next, and trusted members would endeavour to make it a great success.

The Chairman also spoke of the Club's indebtedness to Mr. H. P. C. Ashworth for having drawn the map of the Furneaux Group, and provided the illustration, "The Gannetry on Cat Island," in the February *Naturalist*, at his own cost, and moved a vote of thanks to him for his generosity, which was seconded by Mr. F. G. A. Barnard, and carried unanimously.

PAPERS.

1. By Mr. E. Anderson, entitled "Cocoon Makers and Cocoon Breakers."

The author gave original observations on the methods of emergence of some of our hard-cocoon making moths. This is accomplished in the genus Antheræa by the moth thrusting sickle-shaped projections at the base of the wings through the cocoon, at the same time revolving within, thus cutting its way out. The paper was discussed by Prof. Spencer and Mr. F. G. A. Barnard.

2. By Mr. T. S. Hart, M.A., entitled "The Volcanic Rocks of the Melbourne District."

The author mentioned the different points of eruption near Melbourne, and described the probable flow of the lava streams. Sections show that the marine tertiaries overlie the older volcanic rocks, of which there is probably a second series before the newer volcanic. Some discussion ensued, in which Messrs. T. S. Hall, M.A., and Pritchard took part.

NATURAL HISTORY NOTES.

A newspaper cutting was furnished by Mr. J. Gabriel on the appearance in the Yarra of a fish declared to be Mountain Trout (Galaxias). A note was contributed on the same subject by Mr. H. P. C. Ashworth, stating that the fish were really sea fish, and had been identified by Prof. F. M'Coy, K.C.M.G., F.R.S., as the Tupong, *Pseudophritis Bassii*, family Trachinidæ, described by Count Castelnau in "Proceedings Zoological Society of Victoria," vol. i., 1872, from one specimen obtained in Bass Straits. The fish have penetrated fifty miles up the river, and are being caught in considerable numbers in the lower reaches. Simultaneously with their appearance the Black Cormorant has arrived in large numbers.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening :—By Mr. E. Anderson.—Antheræa moths and cocoons, also Ichneumons of the Antheræa, in illustration of paper. By Mr. H. P. C. Ashworth.—Specimens of fish, the Tupong, *Pseudophritis Bassii*. By Rev. W. Fielder.—Medusæ, from Port Phillip. By Mrs. Flatow.—Hydrozoa, from Port Albert. By C. French, jun.

—Egg of *Casuaris australis*, from North Queensland. By Mr. J. Gabriel.—Ten species of Australian Terns' eggs. By Mr. R. Hall.—Eggs, nests, young and mature birds of *Grallina picata*, *Malurus cyaneus*, *Eopsaltria australis*, *Geobasileus chrysorrhœa*, and *Lamprococcyx plagosus*, from Box Hill. By Mr. T. S. Hart, M.A.—*Voluta Hannafordi*, from Tower Hill Lake, Koroit (new locality); also specimens illustrating paper on volcanic rocks, the series illustrating decomposition of basalt being lent by University Science Club. By Mr. G. E. Hill.—Case of beetles (*Curculionidæ*). By Baron von Mueller, K.C.M.G.—The following plants new for Victoria—viz., *Tillæa pedicellosa*, from Wimmera, collected by F. Reader; *Helichrysum diotophyllum*, from Wimmera, collected by W. H. Matthews; also, orchid *Cryptostylis longifolia*, from Oakleigh, flowering in March, collected by C. French, jun. By Mr. J. Shephard.—Living clusters of Rotifers, *Lacinularia natans*, under microscope, and mounted specimens of Echinoderm and Crustacean larvæ and Radiolaria from Hampton.

After the usual conversazione the meeting terminated.

NOTE.—The following should have been included in the exhibits at the February meeting reported in last number:—By Mr. D. Le Souëf (in illustration of his paper).—Eggs of the Northern Sphecotheres, White-tailed Kingfisher, Silvery-crowned Friar Bird, Shining Flycatcher, Australian Sun-bird, Dusky Honey-eater, Obscure Honey-eater, Large-billed Sericornis, Quoy's Butcher Bird, Cat Bird, Victoria Rifle Bird, Ewing's Fruit Pigeon, Allied Fruit Pigeon, Long-billed Green Pigeon, Yellow-tinted Flycatcher, Chestnut-backed Quail, Crescent-marked Oriole, and Black-fronted Flycatcher, besides many others; also birds' skins and nests, botanical specimens, native weapons, &c.

EXCURSION TO WARRANDYTE.

THERE are probably many, even amongst the more active members of our club, who have but a faint idea of the natural beauties surrounding the pretty little township of Warrandyte, formerly known as Anderson's Creek. This place is situated on the Upper Yarra River, about twenty miles from Melbourne. It was to this spot that a small party of our members—Messrs. D. Best, C. French, C. Frost, W. T. Powell, J. Searle, and H. T. Tisdall—had, in accordance with the programme of excursions for the year 1893–94, arranged a visit.

The party, or rather a portion of it, left town by the 7 a.m. train on Saturday, 18th November. On arrival at Ringwood, which is a station on the Lilydale railway, 15 miles from Mel-

bourne, we were met by Mr. C. Walter, an old friend of one the leaders of the party, who had kindly come across from Warrandyte, some six miles, to welcome us.

The walk from Ringwood to Warrandyte is, upon the whole, most picturesque, and although the Leptospermum bushes were fairly well in bloom, little but the commonest kinds of beetles were to be found, although the bushes were shaken in that energetic style peculiar to the insect-loving portion of our members. Just before reaching Warrandyte some very pretty views are to be obtained, and the miners at work reminded one of the old gold-digging days. The river, in something like its original purity, rushes between boulders and over stones down to the bridge, from which a fine view of the surrounding hills may be obtained. All along the river banks grows quite a thicket of that elegant little myrtaceous plant *Kunzea pedunculariis*, but, although in full flower, comparatively few insects could be obtained from it, the best found being *Distichocera par*, some Cleridæ, and other ordinary beetles.

The afternoon was spent in a somewhat lazy manner, as the scorching heat of the sun rendered it somewhat difficult to capture the insects, as they were most wonderfully active. As it became cooler we sallied out in force, and on the whole, as our list will show, did fairly well. On the following morning we made an early start for the "Pound Bend," quite a romantic spot, with precipitous hills rising abruptly from the river, which here, as in many other places, is most circuitous in its course. On these steep banks many good plants were obtained by Messrs. Tisdall and Walter, the two botanists of the party; whilst the entomologists did fairly well, principally by shaking the trees and loose bark into expanded umbrellas. It was here that one of the party took two specimens of a somewhat rare Buprestid, *Anthaxia*, also a pretty little Longicorn, *Omophœna taniata*, with Carabs, Cleridæ, &c., &c. It was fortunate we had been early astir, as just before noon the rain began to descend, and caused us to make a hasty return to our quarters.

As a full list of our captures would be much too long for the limited space available in our journal, we will content ourselves by stating that the plants collected were between 50 and 60 species, amongst the best being *Pomaderris subrepanda*, *Cryptandra Hookeri*, and *Geranium pilosum*.

Birds appeared to be scarce, although the ordinary kinds, as Crow Shrikes, Giant Kingfisher, Robins, &c., were seen; but there are rare birds in this district, as only a few years since a fine specimen of the Dollar Bird, *Eurystomus pacificus*, was taken a few miles up the river from the township.

No snakes were seen, nor had we a chance, owing to the rain, to visit a place where many lizards are said to frequent. These

latter will, however, we hope, receive attention at some future time.

Insects were not plentiful, it being somewhat early for many kinds; still in Coleoptera nearly one hundred species were captured, the best being the little Longicorn and Buprestid before mentioned.

Of Buprestids 10 species were taken; Elaterids and Eucnemids, 10 species; Clerids, 10 species; Curculionids, 16 species; Longicornes, 14 species; Chrysomelids, 8 species; miscellaneous, about 30 species. Lepidoptera were scarce, although we saw the common species of Pyrameis, Delias, Heteronympha, Xenica, &c., &c.; also a few Hesperiidæ, and a number of Microlepidoptera.

Of Diptera and Hymenoptera only the ordinary kinds were seen, in the former the principal being some of the Tipulidæ and Muscidæ; and in the latter Pompilius, Sphex, Scolia, Thynnus, and a number of ants, many of which would be well worth collecting and working up.

Of other orders few were noticed, and Mr. Frost reports that on the hill side, during the evening of Saturday, he made a fair collection of spiders, and amongst the genera obtained were Saltricus, Tholia, Epeira, Tetragnatha, Thrypna, and Linyphea. Along the old race, near the top of the hill, several quaint-looking Epeiroids were obtained; also Theridium, Drassus, Thomisus, and Hasarius.

Mr. Frost also mentions as remarkable that only two species of lizards were met with—viz., *Liolepisma Guichenoti* and *Siaphus Maccoyi*.

Of other animals collected there were three species of Planarians, and two species of frogs—Pseudophyrne and Crinia, all of the former being young ones, about two to three months old.

Altogether a very enjoyable time was spent, and we take this opportunity of thanking our host, Mr. C. Walter, who was most attentive to us, and some of us, at any rate, will not forget our study of the very complete herbarium of Australian plants collected by Mr. Walters during his travels in most parts of the colonies and elsewhere.—C. FRENCH and C. FROST, co-leaders.

EXCURSION TO CLAYTON.

THE party which visited Clayton on Saturday, 2nd December, 1893, was rather small. However, it was a beautiful day, and we decided to work in a south-easterly direction, and it was not long before signs of insect life began to be in evidence. A specimen of *Junonia vellida*, after wheeling around, settled on a bare patch of ground and was promptly captured, while a couple of "skippers" went whizzing by, giving little chance to the collectors, but raising

hopes of better fortune later on. Clambering over a fence disturbed the repose of a specimen of *Crypsiphasia occultaria*, which, after flying around wildly, dazzled by the brilliant sunshine, finally pitched on the high limb of a large gum tree and there clung for dear life; two more of this species, being approached cautiously, were captured.

In the hope of obtaining some coleoptera, bark stripping was next resorted to, but nothing was found excepting a large colony of the larvæ of *Ænosanda Boisduvalli*; being full fed, a selection was boxed, and then the heath-land was reached. Here we found the skipper *Hesperilla donnysa* flying, but difficult to catch, the wind being somewhat high; however, specimens were eventually obtained, and also, by careful search of the food plant, one larva and several pupæ.

While running about the heath two beautiful emeralds (*Iodis meandraria*) were disturbed and secured, also a pair of *Melitulias graphicata*, and specimens of *Hydriomena subochraria*. Making towards Oakleigh station a single specimen of the blue *Holochila mœrens* was seen flitting gently along, seemingly uncertain as to where to rest for the night—a problem solved by putting it into the collecting box. This completed the captures of the afternoon, and catching the quarter to 6 train the expedition returned home.—Ernest Anderson.

EXCURSION TO BEAUMARIS.

Some seven or eight members of the Club met at Sandringham on Saturday afternoon, 9th December, 1893, and journeyed thence by tram to a quiet little bay a little to the north of the Beaumaris Hotel, and, although the tide was still somewhat high, several of the members did some wading in search of the marine life which frequents this particular spot. Their labours were not in vain, and a good many species of Echinodermata were brought to shore. Mr. Grayson was fortunate enough to lay hands upon some living specimens of a species of octopus, and an effort was made to keep them alive for exhibition at the December meeting, but without success. Their brilliant colouring was the subject of much admiration, adding a beauty to the "beasts" which is entirely absent from the spirit-preserved specimens.

The local form of Haliotis (Ear-shell) was fairly plentiful, and a good many fine specimens were bottled; but the chief interest lay with the sponges, which seem to have taken possession of this sheltered spot. Here they are found in numbers underneath nearly every stone of any size, representing species amongst the Calcarea ranging from the simplest Homocœlan type—such as *Leucosolenia proxima* and *Leucosolenia stipitata*—to the com-

plex forms of the Heterocœlans, represented by *Leucandra echinata* and *Leucilla Australiensis*—not the least interesting amongst the Heterocœlans being the stalked form known as *Sycon raphanus*. This is a splendid type of a calcareous sponge for the microscopist, the perfect sponge being of such a small size that it can be mounted whole for examination under a low power. Indeed, all the sponges referred to above are fairly minute, and if placed in sea-water can be kept alive for a considerable time, thus affording a ready means of examining some points in the anatomy of the group. For instance, if one of the stalked varieties is placed in sea-water under a low power of the microscope, the inhalent and exhalent currents can be clearly seen—the currents being rendered more conspicuous by the addition of a few grains of powdered carmine to the water containing the living sponge. If killed and prepared for microscopic work many interesting details can be made out, not only in the sponge mounted as a whole, but by means of thin slices cut with an ordinary razor and mounted in balsam. On the present occasion many of the sponges were placed at once into different media, such as absolute alcohol, Kleinenberg's solution of picric acid, and a one per cent. solution of osmic acid. Judging from some preparations made by Mr. Shepherd from material killed by osmic acid that method proves to be of the greatest value in histological work, the shape and structure of the collared cells lining the flagellate chambers being very clearly defined. Further investigations on specimens killed by this method will, doubtless, tend to clear up some of the doubtful points which exist as to the extent and function of Sollas's membrane. I have also a series of sections of a sponge (*Sycon raphanus*) collected here, which shows nearly all the principal stages in the development of a calcareous sponge, and the fact is referred to as proof to members that plenty of material is within easy reach for working out the development and anatomy of one of the most interesting groups in the animal kingdom.

The calcareous sponges, however, do not nearly monopolize all the space in this particular spot, for we find, living side by side with them, various species of both silicious and horny sponges. Indeed, the under surface of many stones is entirely covered over with a very delicate film, which examination shows to be the substance of a silicious sponge, and dotted over it here and there are tiny upward growths, which prove to be calcareous sponges. Scrape some of the thin film carefully from the stone and place it in spirit, in which it will keep till such time as it can be prepared as a "mount" for examination. It is worth all the trouble, for the microscope will show it to be made up of a mass of protoplasm, in which is embedded thousands of very delicate "pin-headed" spicules, typical of some of the silicious sponges.

Of the horny sponges we gathered a good example in *Dendrilla rosea*, which has the shape of a number of finger-like processes rising up from a basal portion. Up these digitate processes runs a horny fibre from which smaller horny fibres are given off. The circulation is carried on through the inhalent pores, which occur in groups or areas, and out at small oscula scattered irregularly over the surface.

Whilst we were engaged in marine operations Mr. T. S. Hart arrived to take charge of the geological contingent. Leading his party southwards, he pointed out the chief geological features of the district as shown in the cliffs, and directed attention to the best places for collecting fossils, some of which were carried home to enrich cabinets and act as reminders of a very pleasant day spent under the cliffs at Beaumaris.—Rev. W. Fielder.

THE UNDESCRIBED UREDOSPORES OF *PUCCINIA BURCHARDIÆ*, LUDWIG.

By D. M'Alpine, F.C.S.

(Read before the Field Naturalists' Club of Victoria, 13th November, 1893.)

Specimens of *Burchardia umbellata*, with a rust upon them, were sent to Professor Dr. F. Ludwig, of Greiz, in October, 1890, by Mr. J. G. O. Tepper, F.L.S., of South Australia. The rust was found to be new, and named, after the host-plant, *Puccinia Burchardiæ*. Professor Ludwig has described this new species of Puccinia in vol. iii., part 3, of the "Zeitschrift für Pflanzenkrankheiten, 1893," under date 12th April. Only teleutospores were found, and no uredospores, although the specimens of Burchardia sent were in full flower.

While on a botanical excursion with students on 4th November, at Cheltenham, I came across large patches of *Burchardia umbellata* just at the end of the flowering stage, and in many instances with the remains of the perianth still attached. The plants were found growing in sandy soil, on sloping ground, which was evidently naturally well drained. Although the rust was so common in this district, I have carefully looked out for it elsewhere—for instance at the Royal Horticultural Gardens, Burnley, and in my up-country travels—but have not met with it, although the plant is so very common and widely distributed. Mr. French informs me, however, that he has come across rusted specimens in most parts where the flower grows. The plants found by me were literally black with what proved to be *Puccinia Burchardiæ*, Ludw., and since the fungus has only been recorded for South Australia, and only found upon the leaves, but more

especially because I have found abundance of uredospores, which were absent from the specimens sent from South Australia, I thought it might be desirable to bring these facts under the notice of the Club, and describe the uredospores, such description being necessary for a complete definition of the species. And this absence of uredospores in Dr. Ludwig's specimens is all the more surprising since, as for instance in rust of wheat—*Puccinia graminis*—the uredospores or summer spores appear first to serve as a rapid means of multiplication, while the teleutospores or winter spores appear towards the autumn to tide over the winter and serve for reproduction in the spring.

The Latin description of the fungus given by Professor Ludwig, translated into English, is as follows:—"Sori amphigenous, numerous, small or large, erumpent, surrounded at base by dry cuticle of epidermis, but not covered by cuticle nor possessing paraphyses, circular or elliptical, black. Teleutospores clavate, constricted in the middle, thickened at apex, rounded and pointed in an unusual manner, lower cell tapering into pedicel, yellowish-brown, upper cell elliptical or rarely spherical, chestnut-brown, apex thickened, epispore even, 64–40 (60–50) x 23–14 mm. Pedicel hyaline 60–30 x 6–5 mm."

The habitat is given as on the leaves, but you can see from these specimens that the fungus also attacks the stem, at least in Victoria.

The uredospores were found by me, along with the teleutospores, both on the stem and leaves, sometimes ascending near to the umbellate inflorescence. At this stage the sori containing both kinds of spores were comparatively few in number, and the teleutospores far exceeded the uredospores in numbers. The uredospores are globose or oval, brownish-yellow in colour, echinulate, with four germ pores, $\frac{1}{1000}$–$\frac{1}{800}$ in. x $\frac{1}{1100}$–$\frac{1}{900}$ in.

There are still a large number of undiscovered rusts in Victoria, and they afford a promising field to the investigator in this department. The following works may be recommended for this study:—Plowright's "British Uredineæ and Ustilagineæ," Saccardo's "Sylloge Fungorum," Massee's "British Fungus-Flora," and, as a matter of course, Cooke's "Handbook of Australian Fungi."

THE Inaugural Address of the President (Prof. Ralph Tate) of the Adelaide (1893) meeting of the Australasian Association for the Advancement of Science has been issued as a pamphlet, and forms an excellent record of the progress of Australian Geology to date, first of all enumerating the writers and afterwards showing what has been written respecting the principal formations.

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., LL.D., F.R.S.

(Continued.)

Daviesia Croniniana.

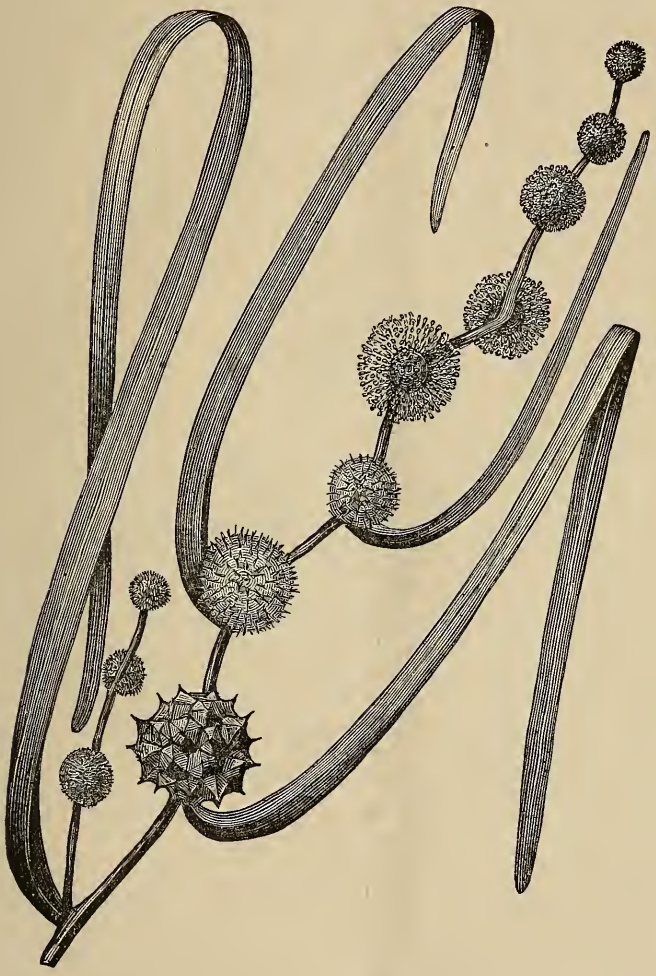
Branchlets much beset with spreading short hairlets; leaves crowded into distant often somewhat verticillar fascicles, rather long, quite linear, pungently pointed, on the surface prominently three-striate, beneath unisulcate or upwards with two additional furrows, at first villosulous, at last glabrescent; umbels few-flowered, sessile within fascicles of mainly young leaves; pedicels glabrous, about as long as the flowers and articulated near them; calyx scantily beset with hairlets, its tube gradually attenuated at the base, its two upper lobes divergent, almost laterally apiculated, its three lower lobes deltoid; petals upwards dull-purplish, the lateral petals about half as long as the upper one, the lower petals still shorter, blunt; ovulary and style glabrous; fruit obliquely ovate-deltoid, short-acuminate, hardly turgid, devoid of any conspicuous stipe.

Towards Lake-Lefroy; Cronin.

Leaves mostly 1–1½ inches long, on very short petioles, while young much incurved, soon straight and rigid, compressed but not of vertical position; beneath bistriate, at the margin slightly thickened, the furrows greyish. Pedicels bractless, but bract-like organs scattered among the floral leaves. Calyx fully ⅙-inch long, its upper lobes almost semi-orbicular, confluent, considerably broader than the three lower lobes. Upper petal about ⅓-inch broad. Filaments downward dilated. Fruit nearly ½-inch long, almost dimidiate-cordate, but at the base nearly truncated, after dehiscence its valves much rolled inward. Seeds unknown.

The fascicular position of the leaves and the nestling of the flowers among overbending indumentous young leaves give to this species quite a peculiar aspect. Systematically it approaches *D. pedunculata.* Incidentally it may here be mentioned that the fruit of *D. filipes* according to Mrs. Biddulph's collection is rhombiform-deltoid, much compressed and about ⅓-inch long.

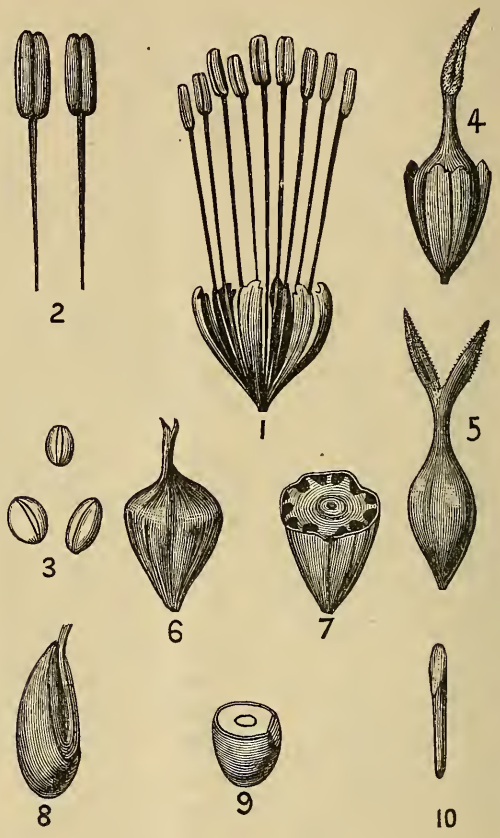
"Transformations of Australian Lepidoptera."— This little pamphlet by Mr. James Lidgett, of Myrniong, Victoria, places on record a number of observations on the early stages of several butterflies and moths, principally Victorian.



SPARGANIUM ANGUSTIFOLIUM.

R. Brown, "Prodromus Floræ Novæ Hollandiæ," 338 (1810).

Drawn by R. Graff.



SPARGANIUM ANGUSTIFOLIUM, R. Brown.

1, a staminate flower; 2, two of the stamens; 3, pollen grains; 4, a pistillate flower; 5, a pistil with two stigmas; 6, fruit; 7, transverse section of fruit; 8, seed; 9, transverse section of seed; 10, portion of embryo. All enlarged, but to various extent.

Drawn by R. Graff.

Field Naturalists' Club of Victoria.

President:

MR. H. T. TISDALL, F.L.S.

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